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POLICY.

Unless otherwise indicated, the views expressed in the original articles in this magazine are those of the individual authors and not necessarily precisely those of the Department of the Army or the U. S. Army Command and General Staff College.

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THE UNITED STATES ARMY

Its Doctrine and Influence on US Military Strategy

General Willard G. Wyman, *United States Army*
Commanding General, United States Continental Army Command
Fort Monroe, Virginia

On 11 December 1957 General Willard G. Wyman, Commanding General, United States Continental Army Command, made a presentation to the Air War College. The MILITARY REVIEW is pleased to present this unclassified version of General Wyman's lucid analysis of the United States Army doctrine and its influence on US military strategy as contained in that presentation. A more complete version of the speech has been published in a classified medium.—Editor.

PHILOLOGISTS agree that all that has been written about all of the subjects of human thought since the dawn of history would not suffice to completely explain what is meant by a single word. So do not expect a complete explanation of Army doctrine in the next 50 minutes. At best I can only "X in" the major bench marks, indicate some of the more significant contour lines, and trust that you already know by heart "the uses of a hill."

In a recent article on our national strategy and military doctrine, Dr. Raymond L. Garthoff used the following thumbnail definition to establish his initial frame of reference: "Strategy relates to the attain-

ment of objectives and doctrine relates to the employment of means."

While too narrow for the scope of our discussion, his definition illuminates a much broader frame of reference if we apply it to the statement in your study circular which sets forth the purpose of this lecture: "To provide an understanding of US Army doctrine and an appreciation of its influence on US military strategy."

Fundamental Principle

In the light of Dr. Garthoff's definition, a fundamental principle of Army doctrine is at once apparent here. It is the principle that the determining influence between the employment of means and the attainment of objectives in war travels on a two-way, three-dimensional street. The universal truth that the means determines the ends as well as vice versa is the roadbed of this two-way street. Its three dimensions are air, sea, and land.

Failure to appreciate the workings of this principle has sent many a nation to the morgue and the autopsy tables of history. For example, consider the prewar objectives of Nazi Germany, the means employed by Hitler to attain them, and the end results. Would the end have been different had Hitler not employed geno-

Army doctrine is not restricted to a uniservice concept, but is based upon a triservice approach to the conduct of future warfare recognizing the manifold possibilities under which such warfare may be conducted

cide and wanton force as he did at Rotterdam, Coventry, Lidice, and in the Ukraine? On the other hand, consider the prewar objectives of France, the imbalance of her military means, the rigidity of her doctrine for employing them, and the consequent disaster of military defeat and occupation.

May historians of the future never have reason to attribute our Nation's fate to either wantonness or rigidity. May we never stake our national existence upon a "Megaton" or a "Magenot Line" anywhere—on land, at sea, in the air, or in the mind.

On the azimuth of this aspiration, we arrive at the first bench mark to understanding Army doctrine. Neither absolute

General Willard G. Wyman was graduated from the United States Military Academy in 1918. He was assigned to the Coast Artillery School in 1919 and upon his graduation a year later, went to the Cavalry School. He attended the Signal School and completed the course in 1926. From 1928 to 1932, he was a language student at Peiping, China. Following his graduation from the U. S. Army Command and General Staff College in 1937, he was assigned as an instructor at the Cavalry School. Assignments since 1941 include duty as Assistant Chief of Staff, G1, IX Army Corps; member of Plans Group, War Plans Division, WDGS; General Stilwell's G3 representative with the Chinese Fifth Army; Assistant Chief of Staff, G3, US Army Forces, China-Burma-India theater; Chief of Plans Subsection, G3, Allied Forces Headquarters in North Africa; and Assistant Division Commander of 1st Infantry Division, 1943-44. In October 1944 he was appointed Commanding General, 71st Infantry Division, which entered combat in Europe in March 1945 and continued in action until V-E Day. He became Assistant Chief of Staff, G2, Army Ground Forces, in 1946 and the following year Chief of Staff, First Army. He commanded IX Corps in Korea, and in 1952 was designated commander of Allied Land Forces, Southeastern Europe, with headquarters at Izmir, Turkey. He was named CG, Sixth Army, in 1954. In August 1955 he became Deputy Commanding General, Headquarters, United States Continental Army Command and assumed command of CONARC in March 1956.

nor rigid, Army doctrine predicates no single solution, no set pattern for national defense. It harbors no narcissistic illusion that land forces alone can enforce our national policy in the teeth of the multidimensional threat posed by our obvious enemy.

✓ Army doctrine is TRISERVICE.

Our triservice doctrine recognizes the entire spectrum of possibilities in warfare—not only as they stem from our own military capabilities and national objectives, but as they stem from the enemy's capabilities and national objectives. Red Russia now has military means of great numerical and technological strength covering the entire gamut of known military force by land, sea, and air.

✓ This full scale of military means enables Soviet planners to exercise great flexibility in their grand strategy. It provides them with a very high potential for accommodation to our own capabilities and responses. Hence the possible characteristics of an armed conflict with the Communist bloc are manifold.

Possibilities Affecting Doctrine

In broad outline, here are three major possibilities that condition our TRISERVICE doctrine. And I take them in order of gravity—not their order of probability.

First Possibility

First, there is the possibility that the enemy might try for a nuclear knockout. This possibility would seem remote. Or does it? That it would be dangerous to rule out such a miscalculation is evinced by the pages of recent history.

In this event it is obvious that our national existence would depend initially upon the performance of our strategic retaliatory forces. But what then? With airbases, ports, factories, and cities on both sides of the Iron Curtain pulverized, do both sides surrender to each other? Or does victory go to the side which can con-

tinue to fight most effectively with the means remaining?

Since it is axiomatic that the first objective of airpower is the destruction of the enemy's airpower, we must not be astigmatic to the possible effect of nuclear parity upon airpower, itself, at the very outset of such a war. *How many planes, missiles, and facilities for their production would be left on both sides after the first few days of an all-out effort?* While this question is as impossible to answer exactly as it is dangerous to ignore, it has one facet of which we may be sure. If there is anything left, there will be *people*. And among the peoples of the world, there will be jackals—like Mussolini when France was reeling in 1940—eager for the spoils. In this situation our national survival would obviously depend upon the loyalty of our allies and the preparedness of our Army to fight with whatever air and naval support remained.

To fulfill the demands posed by this first possibility, broad Army doctrine would require: an Army force in being with a strong training base on which to build and rebuild.

Second Possibility

Second, there is the possibility of a general or global war in which tacit or announced limitations in weaponry and targetry are mutually observed. Such restraint in a future war is neither unprecedented nor irrational—unless we deem mankind to have been irrational ever since the day Cain spared Abel's mother. The entire history of warfare is one continuous precedent of restraint in exercising force. Without it mankind would have been reduced to nonentity long ago. The job of mutual extermination could have been accomplished just as surely with clubs and swords, and just as quickly—just as cheaply as it could with nuclear fission and fusion. Even the Nazis chose military defeat in preference to mutual extermination and refrained from loosing the

products of their bacteriological and chemical laboratories on the world.

Assuming that any restraint is observed in a global war, it appears logical that it would be a limitation in weapons employed against the civil populace. The strategic nuclear weapons on both sides might still be used against purely military targets or not at all.

This possibility in no way mitigates the grim necessity of maintaining a clear-cut superiority in our nuclear retaliatory capability before and during such hostilities. While history indicates that moral law imposes stiff penalties upon nations that violate it in war, it rarely does so in time to save the victims. So our best insurance that mutual restraints will not be broken by the enemy is the obvious ability to make the crime instantly unprofitable. By clear-cut superiority in our nuclear retaliatory capability, I mean a delivery system that cannot be thwarted plus sufficient destructive power to administer a *coup de grâce*. I do not mean, however, that we must be able to destroy our enemy a hundred times or even 10. Once will do.

But even in this second possibility of so many variables in degree, a broad Army doctrine will require: an Army force in being with a strong training base on which to build.

To win another global war waged with mutual restraints in weaponry and targetry against the Communist bloc would require the maximum effort by land, sea, and air that we and our allies could produce. Which of the three services would strike the decisive blow is impossible to predict or even to know after the fact. For example, who could say that winning the undersea struggle would be any more or any less decisive than mastering the enemy in the stratosphere? Without control of vital sealanes, it would be impossible to sustain our embattled allies and forces overseas. Without control in the air, it is doubtful that we could control sea ap-

proaches—let alone land areas—critical to military operations.

✓ But of this we can be sure: The conclusive role in such a conflict would be performed by MAN on the ground with weapons in his hand. Only when he is in a position to enforce any decision at arms upon enemy peoples where they live can any conflict be victoriously concluded. That he will be opposed in great numbers by the enemy's MAN on the ground goes without saying. But numbers alone do not win wars. Otherwise the American people long ago would have been on a diet of black bread and borsch. Nevertheless, the American soldier will need better training, better tools, and stronger air and naval support than ever before to cut his goliath down to size.

Third Possibility

The third possibility is a localized war—a conflict limited in geography, although not necessarily in weaponry. Such a war would be the product of our response to another act of limited Communist aggression like the invasion of South Korea. The localizing factor in the conflict would be the value of the limited objective at stake and the risk to both sides of triggering a thermonuclear holocaust by expanding hostilities.

Far from being remote, the possibility of another localized war could materialize with the next tick of the clock. The Soviet strategy to activate it has been in successful operation ever since Lenin adopted the strategy of limited objectives set forth in the last will and testament of Peter the Great, Czar of Russia. And if you haven't read that document, I suggest that you do so as part of your professional education. Whether penned by Peter or by Napoleon (as some historians claim), there can be no doubt that it is an authentic work of a clever but devious mind. You will find it quoted by Sykes in Volume II of his authoritative book, *A History of Persia*, printed in 1905.

If you thought that *Mein Kampf* was an amazing blueprint for world conquest, you should see how faithfully Peter's heirs have followed his blueprint. In addition to specifying the limited objectives to be taken in sequence, Peter advised his descendants to adopt a priestly dogma, a fanatic approach, which could serve as an ideological tool for subversion. Beginning with the adoption of communism in 1917 and continuing step by step with the annexation of the Baltic States on the north flank, the satellization of the Balkan States on the south flank, the division of Poland, Germany, and China, the pincering of India, right up to more recent events in Syria, the Kremlin's fidelity to Peter's blueprint is at least a remarkable coincidence.

Communist Strategy

Far from being outdated by the atom bomb, the Communist strategy of expansion by limited objectives has proved a highly successful accommodation to our nuclear deterrent. So successful, that the cartographers have been hard put to keep up to date with it. Since 1945 we have seen the successive fall of central Europe, China, and North Indochina, and we have been confronted with aggressive actions against Iran, Greece, Korea, Formosa, Malaya, North Africa, and other areas—all under conditions less than would warrant massive retaliation or general war.

Today—and I use the word literally—Red Russia is continuing to pursue its goal of world domination by a strategy of limited objectives. The value to us of each objective is carefully calculated in advance to be well below the high level of mutual risk posed by the strategic nuclear threat. With a complete scale of military capabilities, Soviet planners can employ the means most appropriate to the objective and our opposition in accordance with the timeless principle of war: "Economy of force."

Having selected a limited objective, they

cannot be deterred by threats of force which are so disproportionate in mutual risk as to be implausible on the face of it. In fact, they can flash aces of their own and "beep beep" across our horizon—not only to remind us that the risk of annihilation is mutual, but to assist them in softening up their prospective victims psychologically.

As the level of mutual risk has risen since 1950 with increasing parity and power of the strategic nuclear threat, so have the value and scope of the limited objectives that Soviet planners may deem it safe to select. In this regard, recent events in the Near East menacing the free world's vital oil supply speak for themselves.

Local War Doctrine

To win a localized war—and here is our doctrine—we must have ready military means as flexible, as controllable, and as usable as our opponents, but more efficient. We must be able to impose a price upon the enemy for limited aggression that exceeds the cost to ourselves, but does not exceed restraints appropriate to the limited objective involved. While we must be able to defeat the enemy tactically, we must be able to leave him an avenue of strategic and political withdrawal that will make it possible for him to accept a limited defeat. In this connection it is interesting to note that the concept of the ancient Chinese strategist, Sun Tzu, of building a "Golden Bridge" behind the enemy cropped up in a figure of speech used by our country's foremost member of the profession of arms at a press conference recently. His inference that it is a good idea, under certain conditions, to leave a back door open for our enemy to retreat from a strategic position is not without significance at a time when absolute concepts in war are so readily realizable.

So I repeat, broad Army doctrine for meeting the possibility of localized war requires: a strong Army force in being with

the ability to move to any part of the globe in minimum time.

Failure to tailor our defense capabilities to the obvious strategy of the enemy is every bit as critical for the Navy and Air Force today as it is for the Army. Unless the Army is provided with the strategic mobility, the modern tools, and the trained men to deter or defeat limited aggression, the United States, in due course, may find herself isolated in a fortress America with her freedom of action to defend herself dangerously restricted.

Tactical Doctrine

Turning now to tactical doctrine, the most important bench mark to remember is this: Our tactical concepts of future operations presume neither the use nor the nonuse of tactical atomic weapons. The very existence of tactical atomic weapons in the hands of the enemy has already conditioned the battle area of the future regardless of *when* or *whether* the weapons are employed. In addition, the lethality of conventional weapons has so increased since World War II that the troop formations employed in Korea, for example, might well invite disaster today, even without the presence of the atomic weapon.

However, it would be naive to assume that the aggressor will always refrain from using one tactical weapon to do the work of a hundred against troops and military targets in the field of operations. Risking tactical retaliation against units in the field poses an acceptable danger quite different from that of risking a retaliatory exchange of strategic nuclear blows which could destroy mankind.

Regardless of the tactical weapons that the enemy employs, moreover, we can never afford to meet the masses of Eurasia on a man-to-man, life-for-life basis.

While we recognize that the destruction of enemy units can often be achieved by capturing, bypassing, or dispersing them, we must always have sufficient tactical

firepower to reduce the enemy to manageable proportions. While we should continue to strive to attain our objectives by superior mobility and schemes of maneuver, we must never forget that the enemy's manpower exceeds ours by eight to one. A series of Pyrrhic victories which imposed a disproportionate drain upon American manpower would be just as disastrous to our country as Napoleon's victories ultimately were to France.

One of the most immediate problems—the reduction of fallout and radiation—has already been solved by science. Tests have shown that nuclear explosives can be “sanitized” to produce negligible fallout effects. While the announcement was coldly received by laymen of the press who thought of it only in terms of strategic bombing against cities—“how dead can we get” some of them said—its tactical importance can scarcely be overstated. Not only does this development make atomic weapons adaptive to a much wider variety of situations on the battlefield, but it renders their tactical use more likely in view of the reduced danger to the civilian populations of the areas involved.

Combat Surveillance

Another, more complex, problem of the atomic battlefield which currently confronts us is that of improving our combat surveillance capability.

The elements for extending our target acquisition and combat surveillance capability must be instantly responsive to the combat commander who has the immediate responsibility of acting upon the information obtained. In the fluidity of situations which we must anticipate in atomic battle, we cannot wait until a target has completely formed to identify, locate, or even detect it. We must be able to detect hostile targets deep in the enemy-dominated portion of the battle area while they are forming. We cannot wait until a tactical situation has crystallized to act upon it. We must be able to deduce from

the information furnished by our combat surveillance system the nature of events before they happen.

Our ground commanders must also have a surveillance capability to cover the area between and behind their units as well as the vastly increased distance in front of their units.

To meet these requirements, a great deal of effort has been devoted to the development of electronic and other sensory devices for indicating enemy installations and activity. While they are readily employable from and within our own area, they are somewhat limited in range by terrain, fog, snow, haze, and ground clutter. As matters now stand the only way we can extend their range to the minimum depth of perception required is by using air platforms to fly the sensory devices into and over suspect areas of enemy activity.

Vertical Mobility

No less important for successful adaptation to the conditions of atomic battle is our requirement for vertical mobility. Without the capability to use the third dimension tactically, it would be impossible for us to cope with a numerically superior enemy who already has this capability to a degree that is just as advanced as the capability for strategic weapon delivery he recently unveiled. Like our enemy's land forces, we must have tactical aerial vehicles that will permit us to:

1. Move patrols and assault forces up to battle group size to seize critical terrain and exploit tactical atomic blows.
2. Move reinforcing elements in depth or laterally to meet or counter an enemy threat or to create one of our own.
3. Effect rapid shifting of weapons with crews and other combat equipment within the battle area—particularly across natural or manmade obstacles.

Please note that I am talking about tactical movement within the battle area. The United States Army has no intention whatsoever of competing with our own

teammates—only with the Red Army. There is no conflict of role or doctrine here—save in the minds of those who mistake the means for the mission. It is no more and no less logical that the Army have flying gun platforms and other tactical vehicles for our purposes *above the ground* than it is for the Air Force and Navy to have jeeps and trucks for their own purposes *on the ground*.

As those of you who have visited our US Army Aviation Center at Fort Rucker, Alabama, well know, we have not been idle in our efforts to provide ourselves with the eyes and vertical mobility we need to stay alive on the atomic battlefield. Craft to meet our tactical requirements are being developed as fast as the stringent limitations of our budget will permit. We are moving ahead with what we have on hand and on the way, changing our tactics and organizations to fit the conditions of atomic battle as they could materialize tomorrow.

Mobile Forces Concept

By next summer all of our divisions will be streamlined. With their new pentagonal organization, the ratio of fighter to administrative personnel is increased and the chain of command shortened. Rockets capable of atomic fires have replaced much of the conventional artillery in the fire support group of the division. Air transportability has been given the high priority that its importance to strategic mobility deserves.

Looming in the background of our transitional scene is a very real danger. To catch an enemy while he is crossing a stream is the classic equivalent of crossing the naval "T." Alert to the possibility that the enemy might come at us in mid-stream, we have been working for three years now with what we call a mobile forces concept which provides our tactical units with combat readiness today, even in this transitional period.

Within the framework of its organic

means, each infantry division has organized and trained mobile forces of combined arms teams having a much higher firepower-manpower ratio than provided by transitional tables of organization. In the 1st Infantry Division at Fort Riley, for instance, each battle group is prepared to field a mobile force with more firepower than an infantry regiment of World War II days but with fewer men than an infantry company.

By integrating tank artillery, automatic weapon, rifle, communication, engineer, and other support elements into tight-knit mobile teams of great tactical self-sufficiency, we are preparing our divisions in advance for the dispersion and fluidity of atomic operations. After experimenting in atomic maneuvers with a mobile force—comparable numerically to a battalion—one division commander voiced the opinion that three such mobile forces could have accomplished the mission in the given situation as effectively as his entire division employed conventionally.

To gear our mobile forces for the rapid responses demanded by atomic battle, cumbersome troop-leading procedures are being eliminated. Instead of formal field orders, simple code signals are being used to set rehearsed tactical plays into motion and to control them.

Work with mobile forces has stimulated the entire Army's response to the requirements of atomic battle and helped us to "break the crust of custom." Especially important is the effect it is producing upon the ability of young troop leaders to THINK in new terms and to handle combined arms decisively.

Joint Doctrine

Our measures of adaptation for atomic battle with the means already available to us have not been confined to Army doctrine alone. We have been working closely with our tactical air teammates to produce a new *Joint Air-Ground Operations Manual*, published in September 1957

which revises and modernizes an earlier, now obsolete text.

Among its other advantages, our new joint doctrine will help us to implement the "Army Operations Center"—a new concept which ties together in one coordinated agency all the means now available to assist the Army commander to place his firepower and keep his maneuvering elements of infantry and armor where he wants them. It is a modernized version of the former fire support coordination center, but with air defense, Army aviation, and electronic warfare added. This concept will be implemented both at corps and field army levels under G3 supervision. Concurrently the old unwieldy joint operations center is discarded and the Air Force will establish small mobile air support operations centers (ASOC's) to work with the Army.

During the coming year [1958] we hope that we will achieve a comparable measure of agreed joint doctrine for airborne and amphibious operations. Certainly, there is a need for us to bring all our joint tactical doctrine up to date. Every day we waste in resistance to change now may be paid for with the blood of blunders in future battle.

Development of Future Requirements

In all our past wars the United States has been forced to develop tactics and tools that could meet the *enemy's* standards *after* hostilities were initiated. This must never happen again. In the future we must ensure that it is the enemy who has the disadvantage.

A highly important step in this direction was taken with the establishment last year [1956] of a field laboratory at Fort Ord, California, where academic theory pointing to new doctrine can be validated. The name of our field laboratory is the "United States Army Combat Development Experimentation Center"—or CDEC in verbal shorthand. CDEC has approximately 50 officers, 20 topflight sci-

entists, and 3,000 experimentation troops devoted solely to the task of producing realistic and unbiased results upon which we can base our tactical doctrine of the future.

Already we are beginning to receive valuable thoughts in many areas that I have mentioned. For example, realistic field tests show that offensive and defensive tactics of the future tend to merge into one with but a single goal: *Fix the enemy for the kill!* Often, tactical firepower alone can accomplish the purpose of maneuver. As a corollary, fire support capabilities will often determine plans of rapid maneuver to a degree never known before.

In future battle, portrayed at Fort Ord with all of the realism that modern scientific technology can produce, it has been clearly demonstrated that cumbersome troop-leading procedures, detailed orders, and improvised tactical groupments of the past can be dangerous. Experiment confirms the necessity and practicability of rehearsed tactical plays by combined arms teams such as we are employing in our Mobile Forces Program.

In addition to refining and testing operational concepts resulting from deductive analysis, CDEC experimentation is beginning to provide valid ideas for the development of methodology for testing future combat formation. At the moment, we do not know what the composition of the Army's basic fighting element will be in 1977; but CDEC's field explorations to date indicate that the need to increase our firepower-manpower ratio will continue to accelerate. More and more as time and technology advance, operations will consist of the coordinated efforts of small, powerful, self-contained units with vastly increased ground and air mobility.

Future Ground Operations

In summary, here are some of the tactical characteristics of future ground operations as they now appear to us:

We see no lines of entrenchment as we

have known them in previous wars. No masses of men waiting in reserve. No roads jammed with trucks moving to the front. In fact, we see no front. Only a battle area.

Within the battle area, to a depth of as much as a hundred miles or more, we see small mobile units deployed at intervals measured in miles instead of yards. While their numerical strength per unit may or may not be much greater than a reinforced company of World War II days, their firepower can exceed that of our old regiments and include all of the trajectories of divisional artillery. With this firepower they dominate the unoccupied ground between them. When the units move, they are guarded against radiation and blast by a protective skin. At rest they are dug in for all-around protection and camouflaged.

Even the language of operations employed here differs from that of the past. New concepts call for new definitions of old terms—even new words to convey our thoughts. For instance, the word "defend" no longer means what it did in World War II parlance. In some situations an order to "defend" actually calls for aggressive action to knock out an enemy unit before it can launch a coordinated attack. Under the conditions of atomic battle, taking and holding the initiative is more important than taking and holding a hill.

Offensive and Defensive Operations

In offensive operations, combat units move rapidly and operate in widely dispersed formations. When necessary, units concentrate sufficiently to accomplish the mission, then quickly redisperse. Aggressive offensive action is continuous whether by fire or maneuver or both. As in the past, tactically important terrain must be fought for and controlled, but it is selected carefully and used as a means to control the battle, destroy enemy forces, create favorable opportunities for use of our own atomic weapons, for line of

sight electronic devices, and to deny the enemy similar advantages.

The tactical defense is fluid with units shifting their positions frequently according to an over-all plan. The entire front is screened by covering forces whose elements may resist fiercely, withdraw without resistance, counterattack violently, or even attack in apparently illogical patterns. The purpose of these deceptive operations is to confuse the enemy, induce him to commit his forces prematurely, create attractive atomic targets, and provide the opportunity for offensive action to destroy him by fire and maneuver.

The Battle Area

Long-range fires—atomic or nonatomic—can be placed instantly anywhere in the battle area necessary to influence the course of operations by guided missile batteries which are located deep in the rear. The exact distance to the rear that these supporting weapons must be located to accomplish their mission depends upon so many variables of situation and geography that it is impossible for anyone to predict today. Consequently, I consider it dangerous to fetter our development now with arbitrary limitations of ranges and rigid definitions of the future battle area which the enemy land forces may choose to ignore. It is the uncertain depth of the battle position that prompts my concern—not an ambition to stamp "US Army" on the moon! I just hope that our united efforts will put us there first as well as safeguard our way of life here on this earth.

Another aspect of our concepts for future battle that has been misinterpreted by the press is that of "depopulation." Decreasing the average number of men per square mile in no way decreases the total number of men that will be needed within a vastly deeper battle area. On the contrary, the casualty-inflicting potential of modern weapons renders it much more probable that we will need more trained

men for future ground combat than ever before.

Effect of Nuclear Weapons

Familiar as you are with the maximum destructive capacity of *strategic* nuclear weapons, and schooled as you are in the current doctrine for their employment, some of you may question their effect upon the feasibility of these tactical concepts. "Of what avail," you may ask, "is ground dispersion, flexible organization, and improved mobility in the battle area of the future against the threat of thermonuclear weapons which even now could obliterate or contaminate an entire theater of operations in a matter of hours? Upon what assumptions regarding the enemy's restraint in the application of nuclear firepower to the battle area are these tactical concepts based? And what assurance is there that the enemy's restraint will hold under the stress of tactical reverse and impending defeat?"

The basic question posed by this line of inquiry is neither new nor nuclear. Nor is it posed to the Army alone. The problem of where the line will be drawn between the *absolute* and the *discriminating* application of force in war has always been with the profession of arms. And never has the final solution been known in advance.

As Chesterton once said, "*ART consists in drawing the line somewhere!*" But even the artist cannot predetermine precisely where he will draw it. He can only provide himself with all of the means to draw it well.

So it is with the ART OF WAR.

Assumptions

While Army doctrine recognizes that there are probable limitations to the force which people will apply—particularly at a time when unlimited force could so swiftly destroy mankind—we draw no lines in advance for the enemy to circumvent or ignore. Our tactical concepts for future land operations make only these assumptions:

1. That our enemies have no more intention of bequeathing the world to the oyster-boring sea worm than we have.

2. That our teammates in the Armed Forces will work in close unison with us and will continue to develop the tools and men to perform their roles in support of our common effort.

3. That the American people will never sell their sons, their freedom, and their national honor down the river.

So assuming, the United States Army is going ahead in its own area of responsibility planning and developing the means to play our part on the TRISERVICE TEAM, to enforce our national policy, and to ensure our national survival.

No Conflict in Doctrine

When I accepted the invitation to address you today, one of the points that I was asked to discuss was the *basic* conflict, if any, between US Army doctrine and the doctrine of the other services. I have saved it to climax my remarks because it is THE point I wish most to leave with you.

In my opinion, there is NO *basic* conflict in doctrine whatsoever between the Army, the Navy, and the Air Force.

Despite what I sometimes read in the pages of our service journals and the staff studies of our word-bird Indians, I refuse to believe that the doctrine of any service is chained to the obsolete concepts of the gunpowder age. I refuse to believe that the fundamental doctrine of any member of our TRISERVICE team was dictated once and forever by an Italian staff officer named Douhet and a Prussian staff officer named Clausewitz. What could be more absurd in our nuclear age than the precept of Clausewitz that any attempt to limit the application of force in war is an "absurdity"? What could be more suicidal than to rely solely upon Douhet's shortcut to victory in an age when his shortcut is a two-way street to total destruction?

I believe that the Army is not alone in

recognizing that a dynamic change has taken place in our military environment during the last decade—not alone in realizing that we must think anew if we are to respond anew. I believe that professional thought throughout the services is moving rapidly in the same direction—toward the concept of a full scale of flexible and usable force for a flexible national strategy. I believe that the American people are moving toward the realization that they must sacrifice much of the frosting on our standard of living in order to keep the cake.

I believe that we are moving toward all of this in our public and professional thinking, but I am equally convinced that American minds and hearts and hands must move faster now than ever before. As always the race is to the swift and laggards die ignominiously.

Surface Friction

It is true that there are some points of surface friction between the three services as we move in the same direction—particularly where our roles, missions, and means overlap. But whoever heard of a good suit of armor that did not overlap at vital points? How safe would our national armor be without some overlap? Who cares if it rubs a bit now and then if it makes our country safer?

Some of our surface friction even produces creative sparks which illuminate the path for all of the services to follow—particularly in the field of research and development. It is imperative, however, that all services receive the benefit of these creative ideas. They should never be hoarded, snuffed out, or dampened by bureaucracy or false economy.

There is one kind of surface friction between the three services that we certainly can do without: public bickering and parochial ballyhoo. For a member of one service to knock the legitimate needs of another service in order to promote public esteem for his own is a disservice to all. We should unite our public informa-

tion efforts and show the American people why we need more dollars for their tridimensional defense.

Unity of Command Imperative

There remains a final bench mark that I must "X in." It is the apex of all military doctrine—the timeless principle of Unity of Command. Sometimes I call it the "I" factor in war to distinguish it from the "Committee" concept of command. Executive committees may work very well for running an industry or business corporation, but not in battle—the big business of our profession. I have yet to see a committee that could vote a battle group up a hill or a bomber over a target. It takes one man who is not afraid to say "I" and face the consequences. One man with the professional competence to know what to do, the guts to decide to do it, and the dynamic leadership to inspire other men to do it with him.

In Europe, right now, Army troops are commanded by an Air Force general; in the Pacific by an admiral. That suits our TRISERVICE doctrine to a "T." Regardless of the mission or composition of the joint forces involved, we believe that individual capacity for TRISERVICE command should be the decisive factor in selection. Military command requires the best man for the job and the absolute loyalty of subordinates.

Conclusion

Doubtless some of our key commanders for joint operations of the future are here in this room. Someday one of my grandsons in Army Green may have the privilege of serving under one of you in Air Force Blue. If so, I trust that he will be commanded by a man who is more than a scientist—more than a tactician. For our country's sake, I hope that he will be commanded by a man who knows by heart the art of war and what Stephen Vincent Benet with poetic insight called: "The uses of a hill!"

THE SOVIET ARMY TODAY

Lieutenant Colonel Jerry M. Wimberley, *General Staff*
Office, Assistant Chief of Staff for Intelligence, Department of the Army

THE January 1957 issue of the *Military Review* carried a timely article entitled "A New Look for the Soviet Ground Forces." Highlighting the startling matériel developments within Soviet ground forces since World War II, the article pointed out significant advances being made toward increased mobility and firepower. A more detailed view of this equipment was given on 7 November 1957, less than a year later, at the Moscow celebration of the 40th Anniversary of the Bolshevik Revolution parade which included even newer and more impressive military hardware.

This collection of equipment, much of which apparently is new only in the sense that it was seen by western observers for the first time, indicates impressive Soviet gains in technological skill and in design and production techniques. It offers a representative picture of the current Soviet arsenal of ground weapons. This picture is worthy of scrutiny, since it is an everchanging portrait of the trends and developments taking place within the Soviet ground forces, and the military capabilities which emerge therefrom.

Small Arms

As indicated in the *Military Review* article of last January, the Soviet rifleman has been equipped with one of three automatic or semiautomatic weapons, all firing identical ammunition. This weapons

group consists of a rifle, submachinegun, and light machinegun, all gas operated and featuring simple design, lightweight, and rugged construction.

Antitank Weapons

The rifle regiment has been equipped with a 107-mm recoilless rifle which, teamed with an 82-mm antitank rocket launcher, gives this unit a hard-hitting defense capable of stopping any tank it may face today. The regiment will continue to receive additional antiarmor support from heavy tanks and assault guns.

Artillery

The artillery family includes a comprehensive array of conventional weapons supplemented by a highly mobile family of mortars ranging to 240-mm in caliber. (Rockets and missiles, also members of the family, are discussed later in this article.)

This desire on the part of the Soviets for mobile artillery is not limited to their lighter weapons. During the November parade two very heavy self-propelled guns, each estimated to be about 300-mm in caliber, were displayed. There is reason to believe that these weapons employ a rocket-assist principle to deliver a projectile to ranges beyond that which could be reached by conventional weapons of like caliber. Whether these unusual weapons are experimental or in actual produc-

The Soviet Army of today is designed to conduct operations under conditions of limited war, all-out nuclear war, or conventional war, and is equipped with the necessary armament to carry out such operations

tion is of lesser importance than the technical skill demonstrated by the Soviets in designing and producing them.

Combat Vehicles

For several years the Soviets have depended upon a series of wheeled armored personnel carriers to transport armored infantry. Manufactured in large numbers, these vehicles were a big step forward in the modernization of the horse-drawn Soviet units in World War II.

However, these carriers possessed poor cross-country mobility and the Soviets have lost no time in correcting this deficiency. The successor to the wheeled *BTR 152* armored personnel carrier is an armored, tracked, amphibious personnel carrier which has been adopted directly from the Soviet light amphibious tank. This new vehicle provides the Soviet infantryman with an impressive degree of mobility in the uninterrupted support of armored formations.

Armor

Soviet tanks and assault guns turned in an outstanding performance during World War II, and the development of armored weapons has continued unabated since that time. The highly regarded *T-54* medium tank, which has been produced in great numbers, recently has been supplemented by a new heavy tank. This armored fighting vehicle actually is an improvement of

the World War II *Joseph Stalin III* which still is considered to be an excellent heavy gun tank. The new heavy tank carries increased armor protection and an improved high velocity 122-mm cannon as primary armament. A new and improved powerplant gives this "tank killer" a cruising range which compares favorably with that of present-day medium tanks.

A light amphibious tank has been developed which greatly enhances the combat reconnaissance capability of Soviet units. Equipped with a 76-mm gun, this vehicle will provide fast, hard-hitting, long-range reconnaissance independent of any requirement for stream and river-crossing equipment.

Rockets and Missiles

The November parade in Moscow offered conclusive evidence of the role to be played by rockets and missiles in future Soviet ground combat operations. Manned in all instances by artillery personnel, this new branch of the support weapons family obviously has come of age. Heading the group are new and improved multilaunch rockets with greatly extended ranges and mounted on new full-track carriers which markedly improve cross-country mobility.

An *Honest John* type rocket, using the amphibious tank chassis as its carrier, was displayed. This weapon highlights the degree to which the Soviets continue the provision of a built-in amphibious capability to their vehicular equipment.

A larger free rocket with a range comparable to very heavy artillery has been provided with a full-track carriage. This weapon represents additional longer range, heavier artillery available to support Soviet tactical formations.

During the parade two artillery missiles of varying size were shown. The first was equipped with a horseshoe-shape device at the rear of the carriage which is employed as a pedestal for the missile during launching operations. Carried in a

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protective steel basket, the missile was transported by the ever-present full-track vehicle that has come to signify Soviet cross-country mobility.

The largest missile shown was mounted on a trailer and towed by a full-track prime mover. Considered to be in the same general performance category as the US *Redstone*, this weapon provides the Soviet field commander with the all-weather, extended range weapon that is demanded by modern concepts of tactical weapons employment.

Underscoring weapons availability for Soviet field forces is a surface-to-air missile similar in general appearance to the *Nike-Ajax*. Mounted on a mobile trailer this weapon will afford the Soviet field commander a very impressive all-weather antiaircraft artillery weapon.

Transport Aircraft

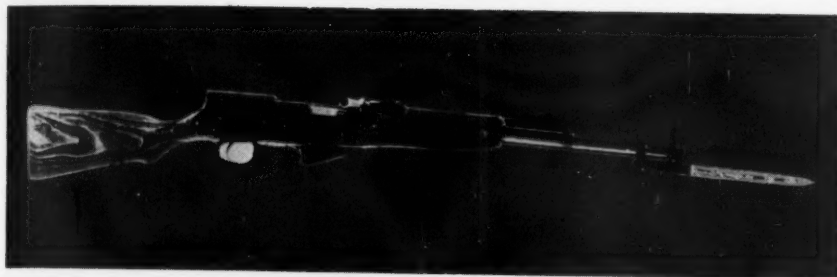
During the past several months the Soviets have displayed no less than five new high performance transport aircraft. Two of these are of immediate military interest. The *Camp*, a twin-engine, turboprop transport is a long stride forward in the Soviet medium weight transport aircraft category, while the *Cat*, a four-engine, turboprop transport, undoubtedly will supplement the *Camp* with its long-range and greater payload capacity. Other recent transport developments include a four-turbojet transport, and two additional four-engine turboprop driven aircraft all of which apparently are designed to compete in the field of international civilian air transportation. Although un-

derstandingly proud of these imposing developments in conventional transport aircraft, the Soviets have not neglected the helicopter field. The January *Military Review* related significant developments in vertical takeoff and landing (VTOL) aircraft, including the *Horse* helicopter which is estimated to lift about five tons. More recent Soviet efforts in this area have produced the *MI-6* helicopter, code named the *Hook*, which is claimed by the designers to have a gross load of more than 12 tons. This twin turbojet-driven heavy-duty, rotary-wing aircraft will provide the Soviet ground forces with an impressive vertical airlift capability.

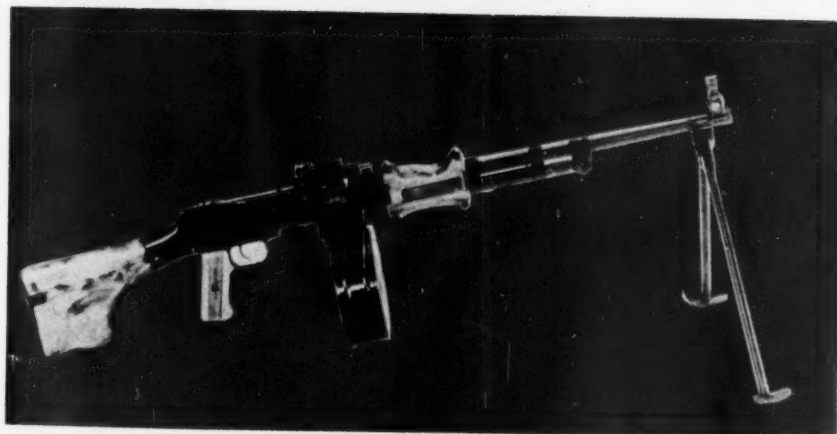
Conclusion

The majority of press reports over recent months have given considerable attention to Soviet technological advances in the realm of earth satellites and possible ICBM-IRBM developments. These notable, interesting, and sometimes conflicting accounts have all but obliterated a basic and very crucial fact: while providing the world with a great deal of propaganda information on its missile and satellite program, the Soviet Government has quietly, efficiently, and rapidly developed an army that is thoroughly designed and adequately equipped to maintain land combat operations of varying scope and under conditions of either all-out, limited, or nonnuclear warfare.

The following 12 pages are devoted to a series of the latest available photographs of the equipment referred to in this article.



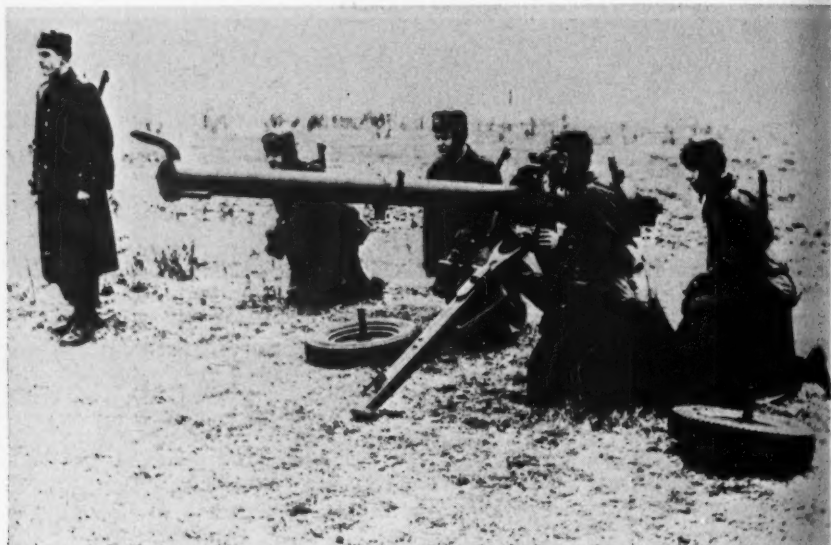
Semiautomatic machinegun



Light machinegun



Submachinegun

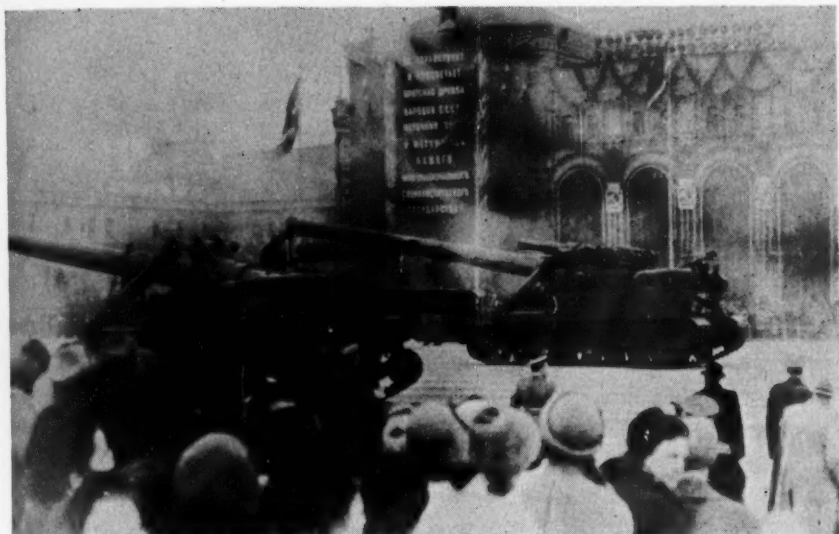


107-mm recoilless rifle



Солдаты подготавливают пуск. Пуск
уже совершён с танком сзади в атаку.

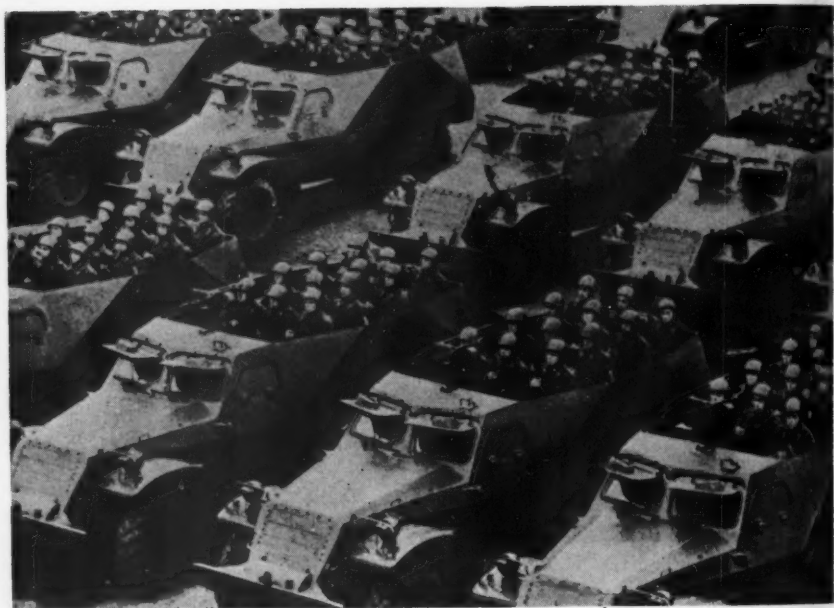
82-mm rocket launcher



Very heavy self-propelled guns



Twin 57-mm self-propelled antiaircraft guns



Wheeled personnel carrier



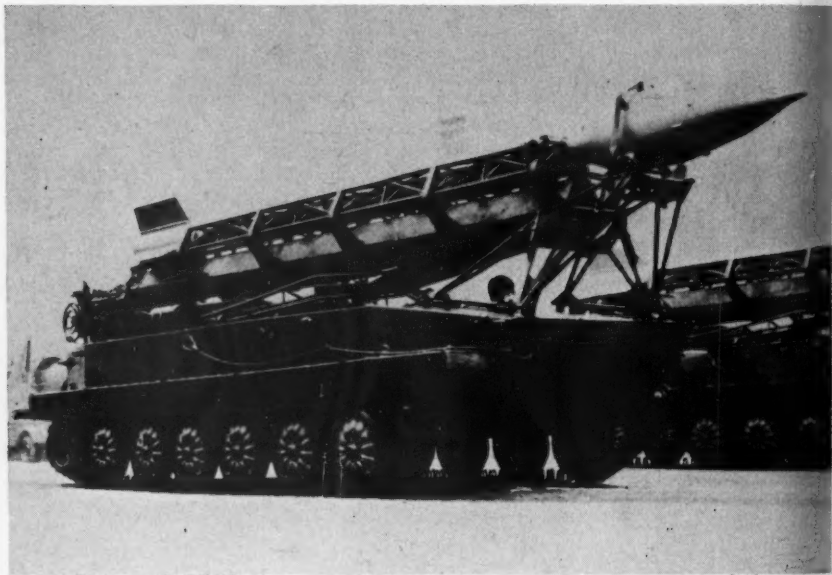
Armored amphibious personnel carrier



New heavy tank



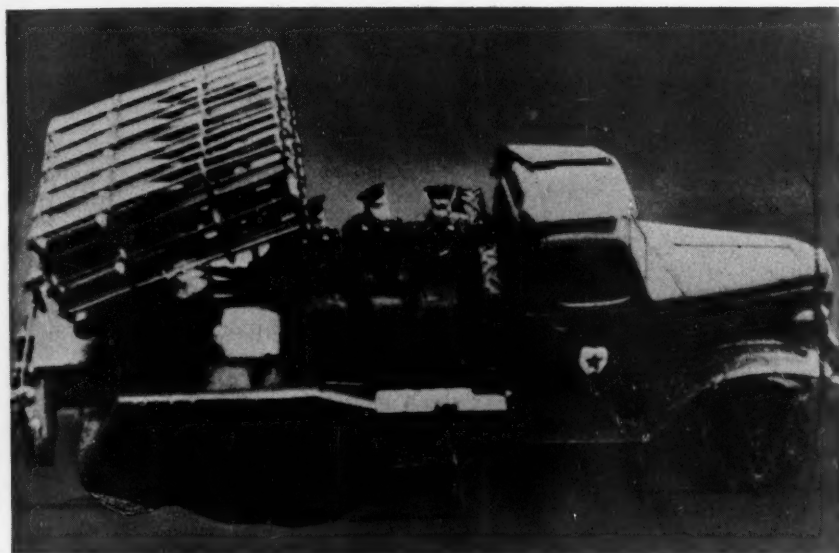
Amphibious light tank



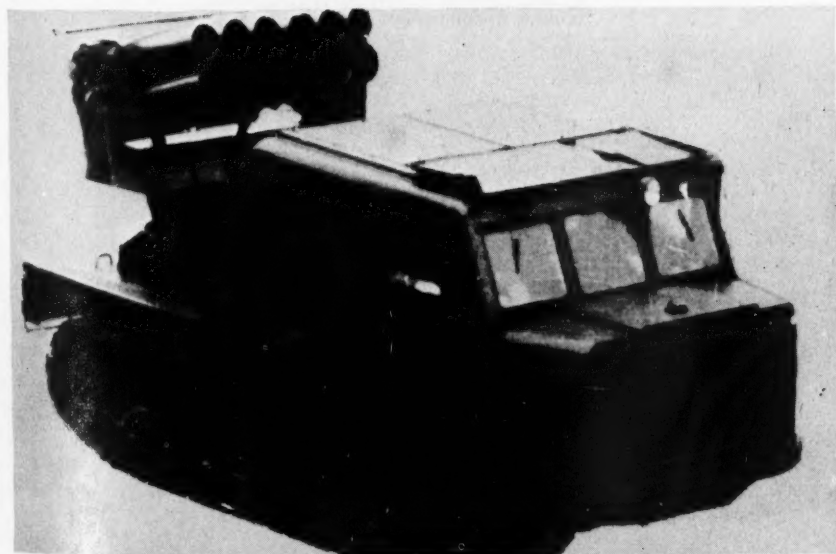
Honest John type artillery rocket



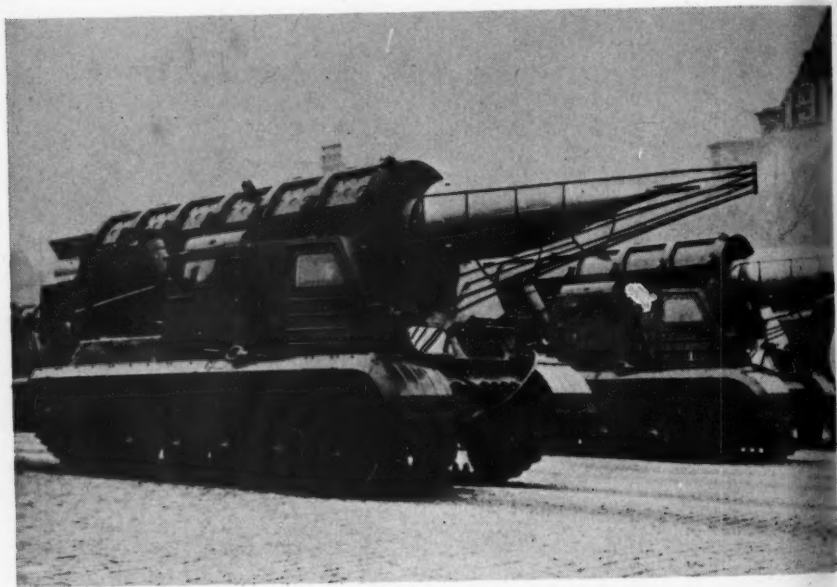
Six-round Little John type artillery rocket



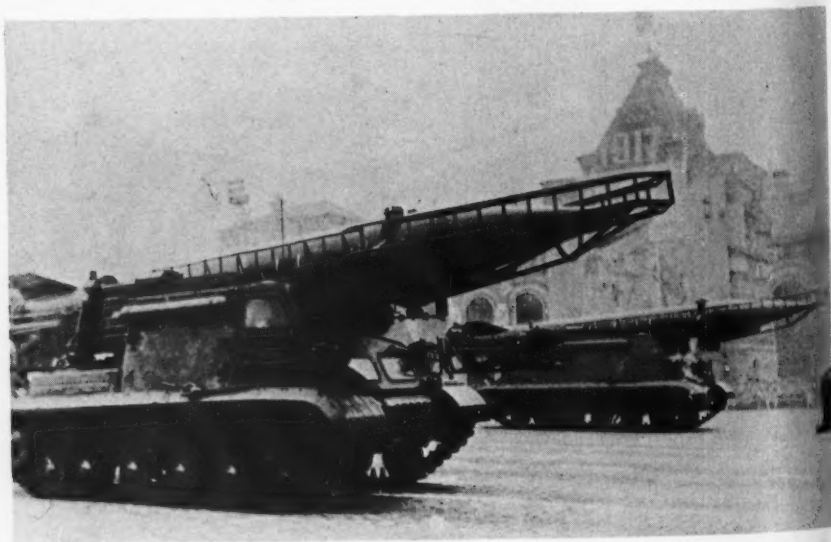
Old 240-mm multilaunch rocket, truck-mounted



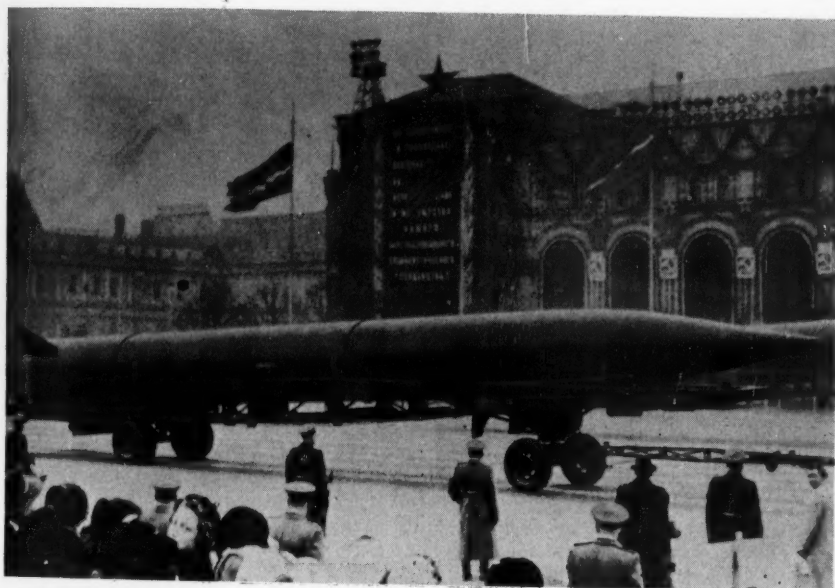
Improved 240-mm multilaunch rocket on full-track chassis



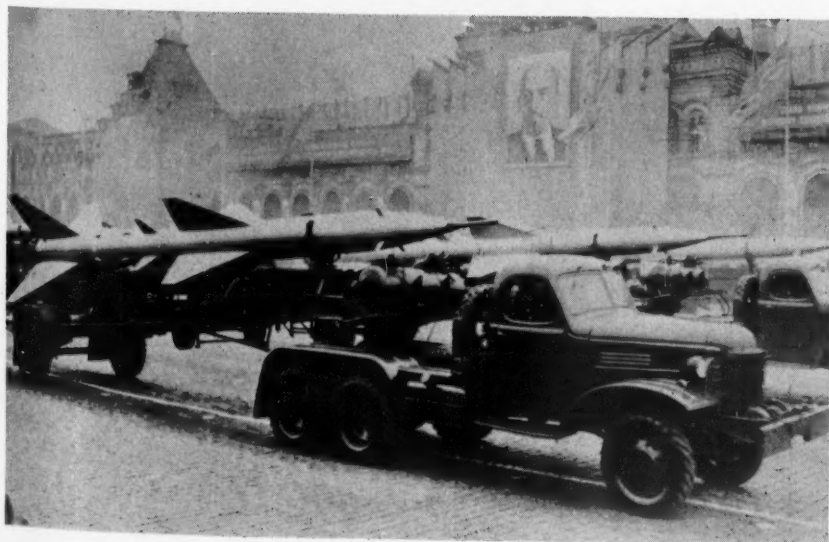
35-mile surface-to-surface missile



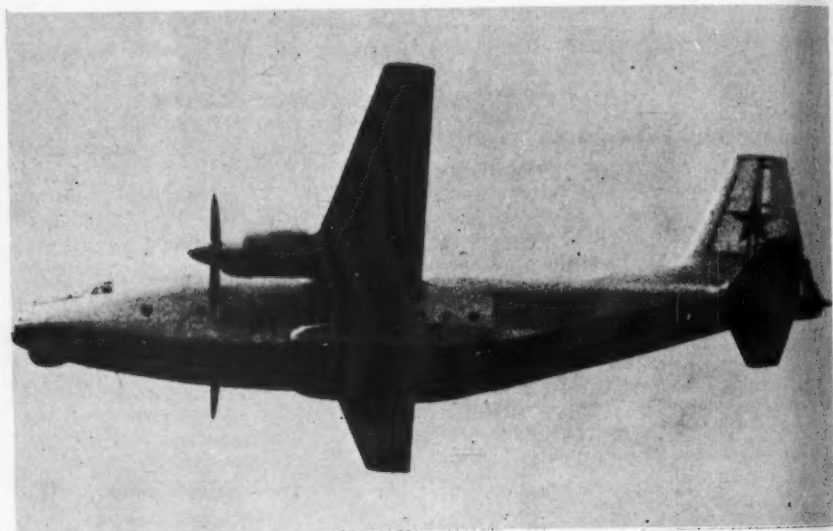
75-mile surface-to-surface missile



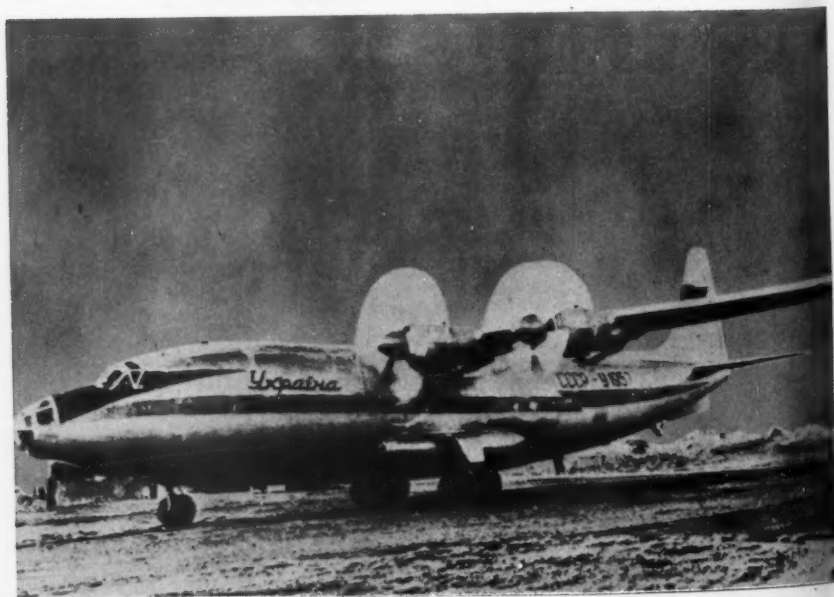
350-mile surface-to-surface missile



Two-stage surface-to-air missile



Twin-turboprop medium assault transport *Camp*



Four-engine turboprop assault transport *Cat*

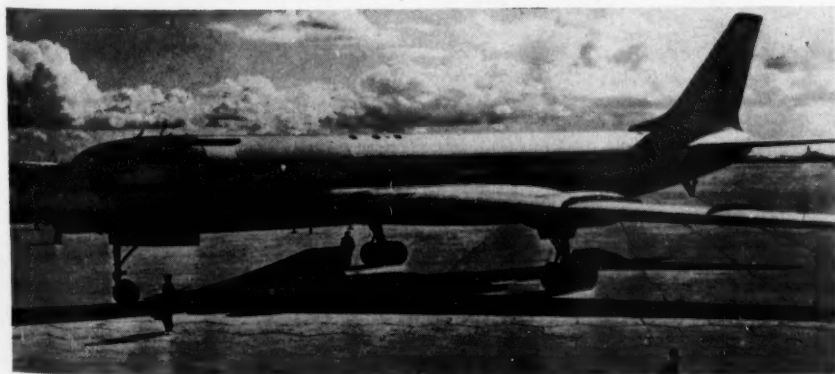


Four-turboprop transport *Moscow*



Four-turboprop transport *Russia*

TU-114



Four-turbojet transport



Heavy helicopter *Horse*



Very heavy helicopter *Hook* with twin turbodrive

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What Is Happening to Army Amphibious Know-How?

Lieutenant Colonel Burr J. Randall, Jr., *Artillery*
Faculty, U. S. Army Command and General Staff College

"BUT, sir, what is an amphibious operation?"

Fantastic question? Perhaps. If the present trend continues, however, it may not be too long before a junior officer would not be unduly censored for displaying such crass ignorance.

There is some basis for this assumption in history. For example, such a question would have been almost plausible in the years between World Wars I and II. The amphibious effort at Gallipoli, in World War I, had been a dismal failure. In fact, Gallipoli "proved" to most military planners that opposed amphibious landings were infeasible or suicidal against modern (World War I) weapons. Thus having accepted the impossibility of amphibious operations, it is not surprising that military policymakers gave little consideration to amphibious techniques, tactics, and equipment.

Marine Corps Studies

One exception to this situation existed in the United States Marine Corps. The Marines analyzed amphibious operations of the past and attempted to determine why some failed and others succeeded. In the course of these studies experiments were conducted in conjunction with the United States Navy. These resulted in the development of techniques for naval gun-

fire support and close air support for landing forces. In addition, matériel improvements such as adding the ramp to the landing craft were made. In the United States the Marine Corps was the pioneer in evolving amphibious technique.

Early Army Training

Prior to the entry of the United States in World War II, three Army divisions and a few separate units had engaged in amphibious training, using the techniques and tactics developed by the Marine Corps. Although this doctrine was basically sound, it failed to make provision for units larger than a regiment. This is understandable when it is recalled that the Marine Corps, before the mobilization for World War II, was composed only of regiments; only in rare circumstances had a brigade been employed. The matériel used in amphibious training during the pre-mobilization period was a far cry from that which was to become familiar during the later stages of World War II. In spite of these inadequacies of equipment, the Army elements taking part in early amphibious exercises gained valuable experience.

World War II Training

Shortly after Pearl Harbor the Army initiated amphibious training on a large

Although the United States Army successfully conducted many amphibious operations during World War II, a critical examination of training methods in this field is necessary if the art is to be kept alive

scale. Two Army amphibious training centers were established on the Atlantic coast—the Amphibious Training Command and the Engineer Amphibian Command.

The Amphibious Training Command was established to train divisions in amphibious operations. This command provided instructors and advisors to divisions designated for amphibious training after completion of their normal training programs. Aside from its staff and faculty, it consisted only of a small, composite battalion of demonstration troops. No boats or other amphibious craft were assigned to the organization. These were provided by the Engineer Amphibian Command which had a twofold mission. It was charged with the training of the Engineer Amphibian Brigades and the support of the Amphibious Training Command in its training mission. All of the practical training conducted by these two commands was of the shore-to-shore type, although the Amphibious Training Command conducted some classroom instruction in ship-to-shore operations.

Amphibious Operations

During World War II the United States launched 61 major amphibious operations. All were successful. This total does not include subsidiary landings made to exploit previous successful landings. In the latter category there were 344 operations

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—again, none was a failure. Of the 61 major amphibious operations, seven employed a landing force composed exclusively of Marines; nine used a landing force consisting of significant elements of both the Army and the Marine Corps; and in 45 operations the landing force was made up entirely of Army units. It should be noted that in the largest amphibious operation in all history—the Normandy landing of World War II—the assault forces consisted entirely of Army troops.

By V-J Day the Army had come a long way in amphibious warfare. Doctrine for the tactical employment and administrative support of larger units had been developed and proved in actual operations. Although amphibious operations by themselves did not win the war, they exerted a decisive influence on the outcome of the conflict both in Europe and in the Pacific.

There was a wealth of amphibious experience in the Army when World War II was over; however, the end of the war brought demobilization. The amphibious training centers were closed and amphibious training for the Army virtually came to a halt. It is significant that during demobilization no effort was made to identify and categorize personnel with amphibious experience. A similar deficiency existed in the field of training literature. In spite of the extensive and hard-won experience in amphibious operations which had accrued to the Army at that time, the knowledge was not crystallized and recorded in the form of field manuals.

However, some continuity was provided by the 2d Amphibious Support Brigade which remained on the Active Army troop list. This unit became a repository for amphibious matters in the Army.

Korea

With Korea came a new requirement for amphibious operations. Although the requirement was more modest than had been the demands of World War II, the Army had difficulty in locating personnel

with amphibious experience for assignment to X Corps before the Inchon landing.

It is almost unbelievable—but true—that between June 1944, when the largest amphibious operation in history was executed, and September 1950, the date for the Inchon landing, the Army had so dissipated its amphibious know-how that it had difficulty in filling key positions of a single corps with personnel experienced in amphibious operations. Fortunately, the techniques came back fast to the old hands, and the new ones proved to be able students of amphibious warfare. This amphibious training was strictly "on the job." As far as the North Korean phase of the war was concerned, Inchon was decisive.

When the decision was made to evacuate X Corps from Hungnam, it was necessary to put the amphibious machinery into reverse. By most standards Hungnam was a defeat, but even so it probably averted a disaster. From the standpoint of amphibious technique—even in reverse—the withdrawal from Hungnam was a magnificent operation. The experience gained in the landings at Inchon, Wonsan, and Iwon was the major factor in the successful accomplishment of the operation.

Hungnam was the last amphibious operation of any size in the Korean war. However, having been used decisively once, the potential of amphibious warfare continued to influence the war until the armistice was signed. The Communists were too well aware of the amphibious capability of the United States forces. As a result, thousands of enemy troops were deployed in coastal positions or were held in reserve for defense against amphibious attacks that were never launched.

Airborne-Amphibious Comparison

In many ways the history of airborne operations parallels the history of amphibious operations. However, although airborne and amphibious training was undertaken by Army units at approximately the

same time before World War II, one significant difference was apparent. That difference was the activation and designation of specific units for the airborne mission. This action had at least two results. First, doctrine evolved and developed had a ready home in newly activated airborne units. Second, as personnel became airborne qualified they were assigned to such units thereby increasing their knowledge in this field.

When committed in an operation, airborne units gained experience, were withdrawn, and had an opportunity to study their own operations and make necessary changes in tactics and techniques. When the larger airborne units were developed, airborne personnel for such units were located easily by MOS on their personnel records. This was never the case with the amphibious mission. No specially designated amphibious divisions were formed. Divisions which had undergone amphibious training and conducted an amphibious assault generally stayed in the line until the campaign was over.

Emphasis on Air Transport

There is considerable emphasis today on the absolute necessity for the strategic and tactical mobility of the US Strategic Army Forces. It is agreed that such a requirement exists and that it must be satisfied if we are to deter wars or—if deterrence fails—to win them.

In this connection, a few of the objectives of Miscellaneous Training as announced in *Tactical Forces and Training Program FY 58*, United States Continental Army Command are as follows:

To conduct amphibious, mountain and cold weather, jungle, desert, ranger, airborne, Army aviation, psychological warfare, and special forces training of selected personnel and units.

To train all elements and units of the field army, which are air transportable, in the principles and techniques of air move-

ment by day or night, in a tactical or administrative movement.

To conduct one battle group scale air-movement exercise in each division of the US Strategic Army Forces available for training.

To conduct two XVIII Airborne Corps battle group scale air-movement exercises, to include participation by all nonairborne support units of the corps.

To conduct an airborne exercise at least once every two months by each airborne unit in postcycle training, or in an appropriate phase of its ATP.

From these objectives it is obvious that the major emphasis reflected in this portion of the USCONARC directive is on air movement. This, of course, is highly desirable since air transport is the fastest means available. It would be advantageous to deploy and support all Army units entirely by air. However, since the required airlift does not now exist, it is essential that a better balance between the amphibious and air-movement capabilities be established and maintained.

Program for Amphibious Training

It is proposed, therefore, that:

1. An Army amphibious school be established, or that one of the existing schools be charged with this responsibility.

2. Administrative procedures be established that will permit the identification and categorization of personnel who have had amphibious experience.

3. Consistent with available assault shipping, a program of joint exercises be instituted to train organizations of the US Strategic Army Forces, except airborne units, in amphibious operations.

If such a three-point program for amphibious training were adopted, it would serve to increase and improve knowledge of amphibious operations.

The Army's current effort in the amphibious professional educational field consists of assigning a few officers to duty

with the Amphibious Forces of the Atlantic and Pacific Fleets, and of filling a modest quota to the Marine Corps Schools in an effort to keep abreast of what the Navy and Marine Corps are doing in the field of amphibious warfare. In the event of mobilization, it would be extremely difficult to fill even a minimum requirement of officers well-grounded in the conduct of amphibious operations.

The Army amphibious school should not only teach amphibious operations, but also should become a repository for amphibious history, doctrine, and tactics. It should serve as the focal point for the development of new doctrine, the conduct of field tests, and the coordination of joint amphibious exercises.

In the field of administrative procedures, at the present time it is almost impossible to locate personnel with an amphibious background, except by personal interview. Such personnel may be needed for actual operations, and are required for a variety of assignments including key slots as instructors in Army service schools.

A program of joint amphibious exercises would give the US Strategic Army Forces a real amphibious capability. Dependent upon equipment availability, the Army then would be prepared for the immediate conduct of a coordinated amphibious and airborne assault or for the early commitment of a major portion of the force even though airlift were not available or were allocated to other missions.

Conclusion

Aside from the advantages listed for the proposed amphibious training program until the airlift required for deployment of the US Strategic Army Forces is available, the art of amphibious warfare must be kept alive. Under conditions of either nuclear or conventional warfare the ground battle must be carried to the enemy. Army amphibious know-how may be a vital factor in accomplishing this objective.

Oil--Lifeblood of the Free World

Lieutenant Colonel Paul J. McClure, Jr., *Armor*
Faculty, U. S. Army Command and General Staff College

As far as the sheer value of territory is concerned, there is no more strategically important area in the world than the Middle East. This area is tremendously important in terms of what it could contribute for our whole effort.

—General Dwight D. Eisenhower, 1951

OIL is the lifeblood of the free world's military power. Without it no tank could move, no plane could fly, no ship could sail, no gun could fire. During World War II oil affected the course of battle in every theater. The early destruction of the enemy's oil producing, refining, and distribution system was given the highest priority by Allied strategic planners. The accomplishment of this objective had a major influence on the final defeat of the enemy powers. Since World War II the mechanization of the armies of the west has progressed at a rapid pace. This mechanization has resulted in a continuing and increasing dependence on oil and oil products.

In peace, as well as war, oil plays a vital role. Much of the industry within the United States depends on oil to provide the heat and power needed to produce the goods on which the Nation's economy depends. In 1956 the United States consumed a total of 3.23 billion barrels of oil or an average of 8.86 million barrels per day. The requirements of western Europe are no less imposing. During the same period the European countries outside the Iron Curtain, but including the

United Kingdom, required a total of 881.47 million barrels of oil to sustain the wheels of industry. This is an average of 2.41 million barrels per day.

Development of Middle East Oil Sources

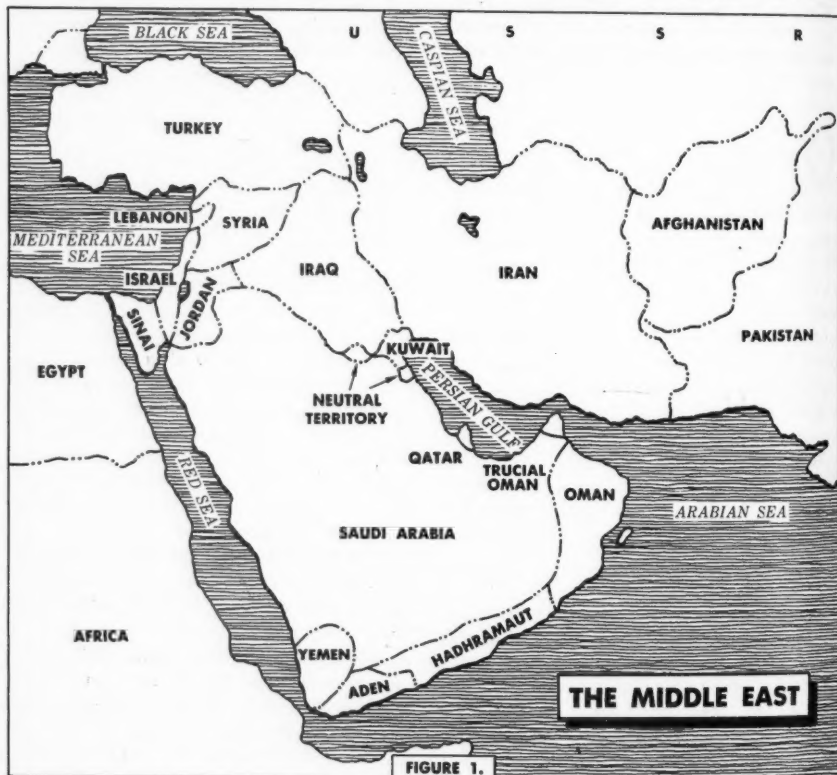
The requirements of modern industry even more than that of the military have led to worldwide exploration in search of additional oil reserves. In no other part of the globe has this exploration been so rewarding as in the Middle East. Initial exploration and drilling resulted in the first Middle East oil well of consequence near Shuster, Iran, in 1908. From this humble beginning the proved oil reserves of all Middle Eastern countries have grown until as of 1 January 1958 they constituted 64.1 percent of the proved oil reserves of the world. (See Figure 1.)

The development of Middle East oil resources was given impetus in 1913 when Winston Churchill, as First Lord of the Admiralty, replaced coal with oil as fuel for the British Navy. This established an early market for Middle East oil. To control the cost of this basic fuel, England, in 1914, purchased a controlling interest in the Anglo-Persian Oil Company. This

War has an insatiable appetite for oil. The vulnerability of the oil resources of the Middle East to Soviet action makes it unrealistic to rely on this area as a source of oil in the event of a future general war

company held a concession from the government of Persia (Iran) which covered approximately 500,000 square miles and embraced all of Persia with the exception of five northern provinces. Oil production from the Persian fields increased steadily over the years. In 1919 total production in these fields amounted to 8.5 million bar-

tracted in Iraq, Bahrain, Kuwait, and Saudi Arabia. Exploration in Iraq led to the discovery of the Kirkuk field in 1927. This field has proved to be one of the richest and most prolific producers of all Middle East oilfields yet discovered. In 1956 the Kirkuk field from 47 wells produced an average of 520,000 barrels of



rels. This figure had been raised to 202.84 million barrels by 1940 and to 242.47 million barrels by 1950.

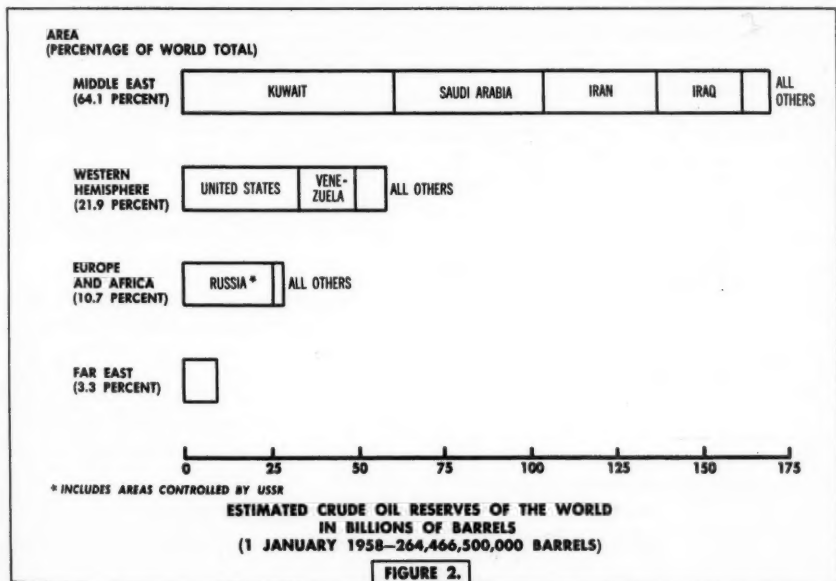
Concurrently with development of the oil resources of Iran, exploration was extended into other areas of the Middle East. By the outbreak of World War II substantial quantities of oil were being ex-

oil per day. This field as of 1 January 1958 had produced a total of 1.36 billion barrels of oil and still contained billions of barrels to satisfy future requirements.

The little sheikdom of Kuwait, which is located on the northwest shore of the Persian Gulf, now ranks as the richest of the Middle East states in terms of oil

reserves. This small country with a total land area of only 1,950 square miles has proved oil reserves of 60 billion barrels. This exceeds the proved reserves of Saudi Arabia, the Middle East country with the second largest proved reserves, by 25 percent. The oil reserves of Kuwait also exceed the proved oil reserves of the United States by approximately 27 billion barrels. Continued exploration has resulted in a steady rise in the total proved oil reserves of both the Middle Eastern area and the

sents many problems. The majority of the larger oilfields are located at the head of the Persian Gulf. This area contains extremely rugged terrain and is one of the hottest and most humid areas in the world. Much of the area is completely desolate requiring the oil producers to provide all the equipment, supplies, and services needed for the production of oil and the sustenance of personnel engaged in the operation. These factors coupled with the transportation problem of moving



United States. However, within recent years the increase in the Middle East has far outdistanced that of the United States.

As of 1 January 1958 the proved oil reserves of all Middle East countries totaled 169.5 billion barrels. As of the same date the proved reserves of the United States totaled 33.0 billion barrels or approximately 19.5 percent of the Middle East total. The proved oil reserve for major areas of the world is shown in Figure 2.

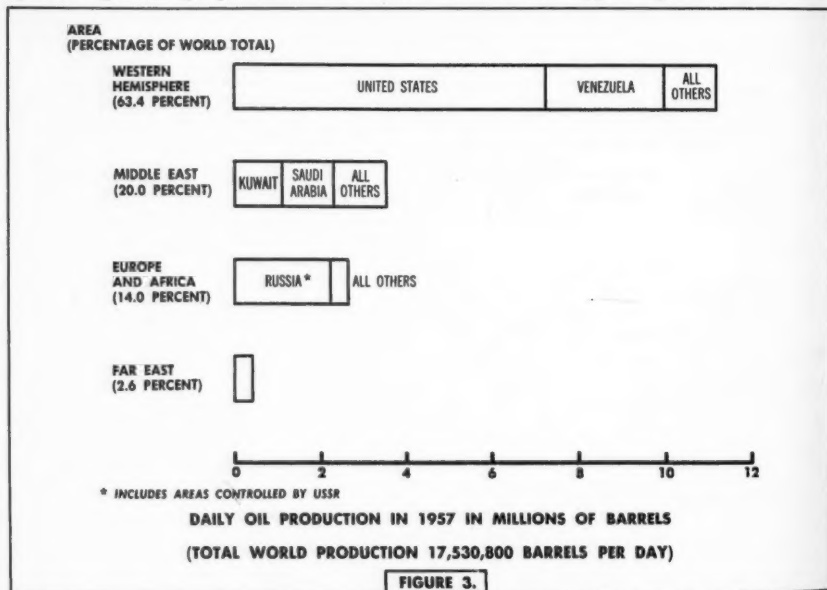
The exploitation of Middle East oil pre-

sents many problems. The majority of the larger oilfields are located at the head of the Persian Gulf. This area contains extremely rugged terrain and is one of the hottest and most humid areas in the world. Much of the area is completely desolate requiring the oil producers to provide all the equipment, supplies, and services needed for the production of oil and the sustenance of personnel engaged in the operation. These factors coupled with the transportation problem of moving

Middle East oil from source to world markets have made the production of Middle East oil a slow and costly process. Whereas, in discovery of oil reserves the Middle East has far outstripped the United States within recent years, in the number of wells in production and the total quantity of oil produced the United States still is the world leader. During 1957 oil production in the United States averaged 7.2 million barrels a day, while production from all Middle East fields averaged 3.5

million barrels per day during the same period. As of July 1957 the United States had a total of 559,000 producing oil wells as compared with 830 for all countries of the Middle East. These figures do not reveal the total production capability of United States wells because of state conservation laws which establish allowables that limit the amount of oil that can be produced. However, they do emphasize the prolific nature of the Middle East fields by showing the huge quantities of oil that

East or through the Suez Canal and Mediterranean Sea to Europe. A network of pipelines consisting of local gathering lines within the oilfields and carrier lines to deliver the crude oil to storage facilities near port areas was constructed to facilitate this movement. The cost of transporting oil through the Suez Canal where tolls of from 11 to 12½ cents a barrel amounted to as much as \$30,000 for a round-trip tanker voyage provided strong incentive for bypassing the canal.



are being produced by a comparatively small number of wells. Worldwide oil production on a daily basis is shown in Figure 3.

Major Pipeline Systems

The movement of Middle East oil to world markets has required the construction of a complex storage and transportation system. Initially, all oil was moved by tanker through the Persian Gulf and then through the Indian Ocean to the Far

With the development of the Kirkuk oil field, which is about equally distant from the Persian Gulf and the Mediterranean Sea, the advantages inherent in piping oil directly to ports on the Mediterranean became overriding. Therefore, in 1932 construction of two 12-inch pipelines from Kirkuk was begun. These lines were buried an average of six feet below the surface and followed a common course to the vicinity of Haditha, Iraq. At Haditha they separated and one line continued to the

southwest across Jordan and terminated at the port of Haifa, Israel. The second line was extended to the west, passing through the Homs—Tripoli gap in the Mediterranean maritime mountain range, to the port of Tripoli, Lebanon.

In late 1945 construction was started on two 16-inch pipelines to parallel the 12-inch lines. These lines also were to terminate at Haifa and Tripoli. The Tripoli line was completed and placed in operation. However, in May 1948 with the outbreak of the Arab-Israeli war, construction of the Haifa line was halted. This line was within 50 miles of completion when work was stopped but has not been completed due to the continuing enmity existing between the Arab nations and the Israelis. The Arab-Israeli conflict also resulted in the closing of the existing 12-inch pipeline to Haifa as Iraq refused to permit oil to be sent to, or through, the State of Israel.

New Pipelines

To counteract the loss of the pipeline capacity to Haifa, construction of a 30-inch pipeline from Kirkuk to Baniyas, Syria, was begun in 1950 and placed in operation in 1952. This line parallels the two Tripoli lines as far as the west end of the Homs—Tripoli gap and then follows the Mediterranean coast to Baniyas. The three operating pipelines from Kirkuk to the Mediterranean ports have a throughput capacity of 465,000 barrels of oil per day.

The most ambitious pipeline project yet attempted in the Middle East consists of a 30-inch line that originates at Qatif,

Saudi Arabia, and terminates at Sidon, Lebanon. This pipeline, known as "Tapline," with its gathering lines totals 1,068 miles in length. The line was completed in 1950 at a cost of 200 million dollars and presently is capable of transporting 320,000 barrels of oil per day. During 1957 plans were completed for adding four additional pumping stations to "Tapline" to raise its capacity by 90,000 barrels of oil per day. On completion of this project, the line will have a daily throughput capacity of 410,000 barrels.

All pipelines which have been extended to the Mediterranean Sea to date cross Syrian territory prior to reaching their western terminus. Thus the movement from producing fields to Mediterranean tanker terminals of approximately 785,000 barrels of oil per day is dependent on Syrian cooperation for passage. In late 1956, during the brief period of hostilities that followed the seizure of the Suez Canal by President Gamal Abdel Nasser of Egypt, Syria destroyed pumping stations on the Kirkuk—Mediterranean pipelines and completely stopped the flow of oil through those lines. This action, coupled with the blocking of the Suez Canal by Egypt, created an immediate oil shortage in Europe. This shortage was overcome at great expense and with difficulty by pressing into service all available oil tankers and augmenting oil shipments from the Middle East with shipments from the United States and Venezuela. Because of the uncertainty of oil passage through Syria, plans currently are being made for the construction of a large size pipeline that will bypass this country. This line tentatively is scheduled to extend from oilfields at the head of the Persian Gulf across portions of Iran, Iraq, southern Turkey, and to terminate at the port of Iskenderon, Turkey. When placed in operation this line will reduce the present dependence on Syria for the passage of oil to world markets.

Lieutenant Colonel Paul J. McClure, Jr., served with the 5th Tank Battalion, 16th Armored Division, in Europe during World War II. A graduate of the Advanced Course of the Armor School in 1951, he served in Europe with the 2d Armored Division for three years prior to attending the Regular Course of the U. S. Army Command and General Staff College. Upon completion of the course in 1955 he was assigned to the faculty of the College.

Refining Capacity

The development of refining capacity has progressed at a much slower pace in the Middle East than has the discovery of new sources of oil. As of 1 January 1958 there were a total of 17 oil refineries in operation in all the countries of the Middle East. These refineries had a total crude distillation capacity of 1.25 million barrels per day and a cracking capacity of 114,400 barrels a day. The first refinery constructed in the Middle East was started at Abadan, Iran, in 1911. During subsequent years this refinery was expanded numerous times until by 1950 it covered a total of 400 acres and was the world's largest oil refinery. As of 1 January 1958 the Abadan refinery had a crude distillation capacity of 514,000 and a cracking capacity of 30,000 barrels of oil per day. This refinery continues to be one of the largest in the world.

The second largest refinery in the Middle East is located on Bahrain Island which lies offshore from Saudi Arabia in the Persian Gulf. The capacity of the refinery on Bahrain Island far exceeds the amount of crude oil produced on the island. To provide additional crude to the island refinery, a 34-mile pipeline has been extended from Saudi Arabia with a considerable portion of the pipeline lying under the Persian Gulf. The crude distillation and cracking capacity of this refinery amounted to 211,000 and 43,320 barrels of oil respectively as of 1 January 1958. In addition to the two largest refineries, there are refineries of substantial capacity at Ras Tanura, Saudi Arabia; Haifa, Israel; and Mina-Al-Ahmadi, Kuwait. Present plans provide for expansion of some existing refineries and the construction of additional refineries in the immediate future.

Oil for Postwar Europe

For many years the United States exported huge quantities of oil and oil products to all parts of the world and gave

little thought to the effect of this action on her oil reserves. However, the heavy demands generated by World War II brought a realization to the United States that her oil resources were not inexhaustible. During World War II the United States provided an estimated 69 percent of the oil requirements of all the Allied nations. To meet this requirement the United States shipped overseas twice as many tons of oil and oil products as the combined total of all other cargoes.

As a result of this terrific drain on the Nation's oil resources, the United States could ill afford to provide from domestic sources the oil required to rebuild and sustain the shattered economy of other free world countries. The enormous postwar domestic demand for oil also was such as to require all the crude oil that could be produced. At the end of World War II the free countries of Europe were able to provide approximately 20 percent of their crude oil requirements from local sources. One of the early features of the Marshall Plan, which had as its over-all objective the rehabilitation of European industry and the strengthening of its economy, was to provide the oil needed for European recovery.

Concurrently with the increase in need for oil by European countries, the production of oil was increased greatly within the Middle East. It was, therefore, natural that administrators of the European Recovery Program should look to the Middle East for the oil supplies needed. Supplying Europe's oil requirements from Middle East sources has a number of advantages. The Middle East oilfields are within an area which has long been a USSR objective for ultimate domination. Therefore, all oil removed is that much less that would be available to the Russians should they gain control of the area. To the same extent the oil reserves of the free world are conserved to meet future requirements. The economic needs of highly industri-

alized Europe and the agrarian Middle East are complementary. Europe must have oil to produce goods for world markets; the countries of the Middle East require these manufactured goods and also currency to purchase goods in other markets.

The price differential between oil produced in the Middle East and that from fields in the Western Hemisphere constitutes an additional advantage. Crude oil prices at Persian Gulf ports average less than \$1.90 per barrel and approximately \$2.59 per barrel at pipeline terminals on the Mediterranean. Oil of equivalent grade is priced at over \$3.00 per barrel at Texas gulf coast ports and at approximately \$2.80 per barrel at Venezuelan ports. Since 1950 the Middle East has provided substantially all of the oil required by European countries. The divorcing of Europe from dependence on the United States for her crude oil requirements has worked to the advantage of all countries concerned.

USSR and the Middle East

Since the days of the czars, Russia has aspired for warm water ports and domination over the Black Sea area and the Turkish Straits. This national ambition was reiterated on 26 November 1940 when Secret Protocol Number 1 to a draft treaty between Germany and the USSR was signed. In this protocol it was stated: "The Soviet Union declares that its territorial aspirations center south of the national territory of the Soviet Union in the direction of the Indian Ocean."

During World War II the Soviet Union was unable to acquire the territory which she desired. Since World War II the Soviet Union has redoubled her efforts in an attempt to dominate the countries of the Middle East. These efforts have included the sowing of seeds of dissension among the Arab countries, capitalizing on the anti-Israeli feeling in the area, and the furnishing of arms and ammunition

to countries most receptive to Communist doctrine. Recent events in the Middle East and the continuing tension which these events have created in international relations testify to the Soviet success. These political developments make it necessary carefully to evaluate the reliance which the free world can place on Middle East oil sources in a future limited or general war.

The proximity of Soviet airbases to the producing fields and the size of the Soviet submarine fleet are important factors. The distance from Soviet territory adjacent to the Caspian Sea to the oilfields at the head of the Persian Gulf is approximately 700 miles, to the Kirkuk field approximately 325 miles. The Soviet submarine capability now is greater than that of any other country in the world. *Jane's Fighting Ships* credits the USSR with having 500 submarines in being of which over half are medium or large ocean-going types.

As pointed out earlier the Middle East oilfields in many instances are located in desolate areas and are remote from world markets. To move the oil to centers of population, pipelines and tanker terminals are required. The destruction of these pipelines and tanker terminals either through bombing attack or sabotage would effectively cut off the flow of Middle East oil. By striking at the transportation facilities rather than at the oilfields and refineries, the Soviets could expect to accomplish their purpose of denying oil to the allied nations while preserving the basic production facilities for their later exploitation. The movement of oil by tanker from Persian Gulf ports is over long and exposed routes. Oil shipments to Europe from these ports moves via either the Suez Canal and Mediterranean or around the Cape of Good Hope.

The ease with which the Suez Canal can be blocked was demonstrated by Egypt in late 1956. By employing nuclear weapons against the canal, it could be blocked

effectively for an extended period of time. Oil tankers moving from pipeline terminals on the Mediterranean are vulnerable to both Soviet air and submarine attack. However, the ease with which the pipeline and terminal facilities can be destroyed makes it probable that this course of action would be adopted and that no oil would reach the Mediterranean for shipment by tanker.

Routes Vulnerable

Oil shipments from the head of the Persian Gulf destined for the Far East or Europe via the Cape of Good Hope must traverse the Arabian Sea and Indian Ocean to reach major centers of population. These routes too are vulnerable to Soviet attack by either submarine or air. From southern Russia to the mouth of the Persian Gulf is only 700 miles. This is within easy bombing range for the Soviet *IL 28* light attack bomber. The extended range of modern submarines also permits their employment to seal the Persian Gulf effectively and to prohibit allied tanker movements.

In the event of a limited war in the Middle East, the movement of substantial quantities of oil from the area still may be possible. However, the vulnerability of present pipelines to the Mediterranean precludes reliance on their use. Construction of an additional pipeline, generally through Iraq and southern Turkey, may make some oil available at Mediterranean ports. The ease with which any pipeline may be destroyed makes it probable that the bulk of the oil moved must be transported by tanker from ports on the Persian Gulf. During a limited war this might be quite feasible as protection of a comparatively small land area would be involved. Since the Suez Canal could not be relied upon the longer cape route would be required.

This possibility generates a requirement for a substantial increase in the free world tanker fleet. The requirement has been

recognized and as of late 1957 the world's shipbuilding yards were working unceasingly to turn out additional oil tankers. Many of the tankers under construction are classed as supertankers carrying cargoes in excess of 45,000 dead weight tons. The larger of these are incapable of negotiating the Suez Canal because of their draft.

If a general war should break out in the Middle East—and any war in which the USSR participates could be expected to become a general war immediately—it is doubtful that any oil could be moved from the Middle East. The sabotage, air, and submarine capability of the USSR is such as to preclude depending on the area for any of the free world's oil requirements. In a general war involving Europe, but excluding the Middle East as a land battle area, the same result probably would obtain. Sabotage of pipelines, storage facilities, and tanker terminals plus the destruction by submarine of tankers attempting to leave the Persian Gulf would reduce to a thin trickle the flow of oil reaching outside ports.

Conclusions

The Middle East as the reservoir of the world's largest known oil reserves is of great importance to the free world. During time of peace it provides a source of comparatively inexpensive crude oil to fill the requirements of oil deficient areas, principally Europe. The further development and the exploitation of Middle East oil sources is of mutual benefit to the producing areas and to those countries which import Middle East oil. The exploitation of Middle East oil also is valuable as a conservation measure for those oil producing areas that are less susceptible to Russian interference.

The vulnerability of Middle East oil fields to Russian attack makes it unrealistic to rely on this area as a primary source of oil during a general war. The storage

and transportation system required for moving oil from the area must be considered as an early and continuing target for Soviet neutralization in the event of war. The comparative ease with which this neutralization could be accomplished prohibits the expenditure of the military effort that would be required to secure the area from Soviet attack or infiltration.

In the event of a limited war in the Middle East, oil shipments from countries adjacent to the Persian Gulf probably could be continued. However, reliance could not be placed on moving any oil through present pipelines to Mediterranean terminals, or through the Suez Canal. All oil would have to be moved by tanker via the Indian Ocean routes. This, while requiring the movement of Middle East oil over greater distances, still would provide substantial quantities of oil for use of the free world.

In the event of a general war the Western Hemisphere would have to provide the oil needed by the allied armies. The United

States again would be called on to provide the bulk of the oil products required. However, both Venezuela and Canada would be able to provide substantial assistance. The movement of oil and oil products to battle areas would require thousands of oil tankers. Tankers now in being plus those being constructed would provide the means for fulfilling this requirement. The continued employment of these tankers would be dependent on the early reduction of the Soviet submarine capability. Hitler, through the use of the submarine, destroyed hundreds of oil tankers during World War II. With the increased capability of today's submarine, the early destruction of the Soviet submarine fleet would be required if the allied armies are to be sustained.

Finally, the search for additional oil sources in areas outside the Soviet orbit must be continued and intensified. War has an insatiable appetite for oil—on it the free world's continued existence depends.

Considering that petroleum products have represented as much as 50 to 75 percent of military supply tonnage in World War II and Korea it is evident that as vehicles are equipped with more powerful motors, as more aircraft and more self-propelled equipment come into use, this aspect of supply will become increasingly important.

Major General A. T. McNamara

OPERATION ORDER

PENTOMIC INFANTRY DIVISION

Major Eugene C. Camp, *Infantry*
Faculty, U. S. Army Command and General Staff College

ALTHOUGH changes in organization and tactics have been effected in the Pentomic Infantry Division, the technique of preparing an operation order for the division remains unchanged. The steps in preparing the order, and modifications required, are discussed through the medium of a theoretical attack situation.

The Situation

Early 13 July 19-- the 20th Infantry Division attacked to seize Hill 500 (Figure 1). By 0900 Hill 500 had been secured by the 3d Battle Group, 63d Infantry, and the attack was continued against stubborn Aggressor delaying action. By 1400 the forces of the division are disposed as shown on Figure 1. All combat troops have closed in their assigned areas with the exception of the 5th Battle Group, 65th Infantry. This unit is marching now, and will close late this afternoon.

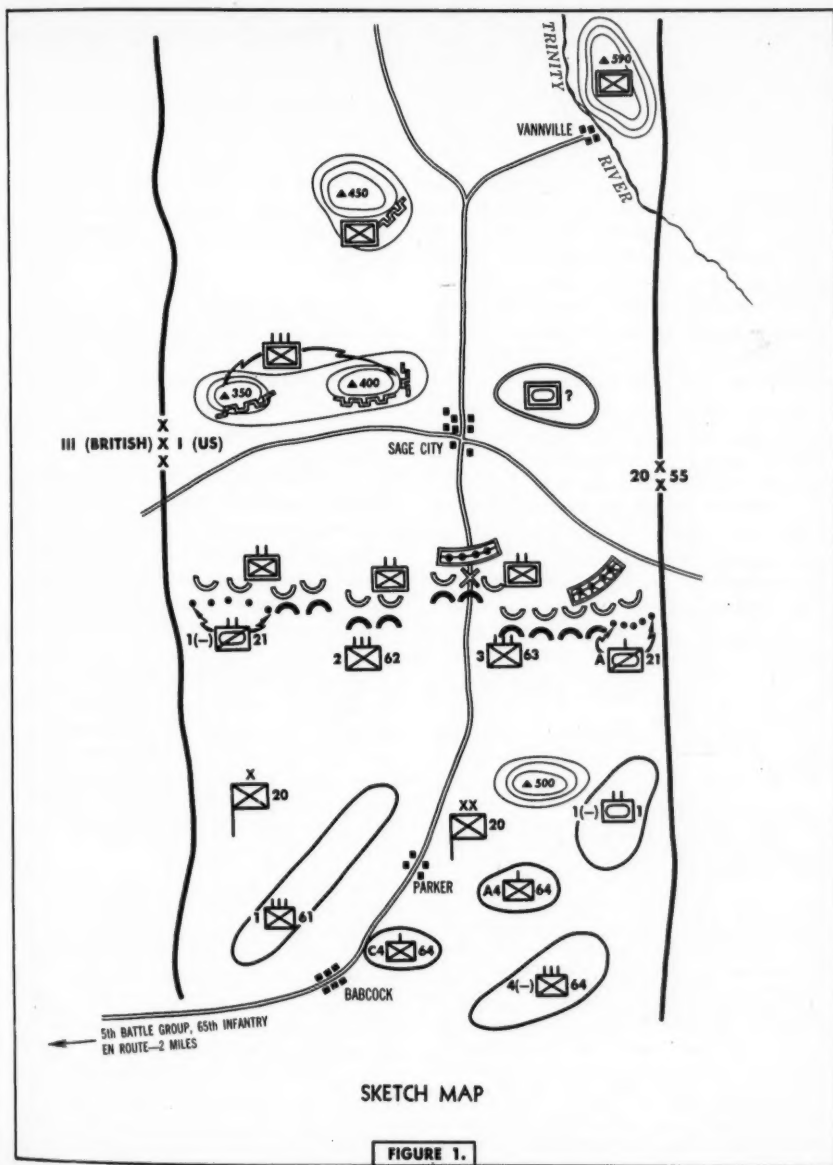
At 1045 an order was received from I Corps for the continuation of the attack on 14 July. A commanders' conference was held at 1215 in the vicinity of the division command post. The Commanding General, Major General Nichols, announced his decision and concept of the operation. Overlay type fragmentary orders were issued at the completion of the meeting. It is now 1415 and the Assistant G3 is in the

process of preparing the division operation order. The following information is available.

The Plan

In accordance with the division SOP a tape recording was made of the commanders' conference. The playback of General Nichols' statements includes the following: "As you know, Corps wants to continue the attack with all three infantry divisions at 0900 tomorrow. We will attack with the 2d Battle Group, 62d Infantry, and 3d Battle Group, 63d Infantry to seize Hill 400 and Sage City respectively. We will employ two nuclear weapons to effect the penetration, and have one on-call to use against Hill 450. As soon as this attack is going well I want to pass through two battle groups to seize Hill 450 and Vannville. We have to deny Hill 590 to Aggressor, so we will hit it hard with a nuclear weapon, based on our movement into Vannville. We will be ready to hit that area again, should Aggressor be so cooperative as to reoccupy his position. The 4th Battle Group, 64th Infantry will take Vannville. (At this time there was a discussion between the commanding general and the commanding officer, 5th Battle Group, 65th Infantry concerning the disposition and closing time of that unit.) All right then, the 5th Battle Group, 65th

Techniques employed in preparing the operation order for the Pentomic Infantry Division are not new; some modification is needed, however, to reflect changes in organization and incorporation of nuclear fires



Infantry will take Hill 450. Gray (the G3), give the armored carriers to the groups going for Hill 450 and Vannville, however, we want to recover them as soon as possible to move any of the other three groups on up. Give the road Sage City—Vannville to the 4th Battle Group, 64th Infantry. I want one tank company with each of the groups attacking beyond Objective 1 and 2. The 1st Squadron, 21st Cavalry will continue to protect the flanks and maintain contact. We will fire a preparation prior to H-hour. Initial division reserve consists of the 1st Battle Group, 61st Infantry, two ALFA and one BRAVO weapon, and the tank battalion (-)."

The G2 Section is preparing an intelligence annex for the order which also will have an enemy dispositions overlay. The following Essential Element of Information (EEI) must be emphasized. "What natural or artificial obstacles or barriers exist within the division zone? What are their nature and extent? Special attention to the Vannville area."

Pertinent extracts of the I Corps order include:

* * * * *

b. 20th Inf Div:

Attached: 2d Med How Bn, 631st Artillery

(1) Attack 140900 July to seize VANNVILLE and Hill 450.

(2) Be prepared to continue the attack to the NW on order.

* * * * *

Major Eugene C. Camp entered the service in 1940, was stationed at Pearl Harbor on 7 December 1941, and received his commission at Natambua, Fiji Islands, in 1943. He also served in the Northern Solomons during World War II. A graduate of the Advanced Course of The Infantry School in 1949, he served in Germany from 1949 to 1954 with the 2d Armored Division and the V Corps, G3 Section. Upon his completion of the Regular Course of the U. S. Army Command and General Staff College in 1955, he was assigned to the faculty of the College.

e. Corps Artillery

(1) 61st FA Gp: reinf 20th Inf Div Arty.

* * * * *

(5) 71st FA Gp: GS

* * * * *

g. 51st Engr Bde

* * * * *

(3) 534th Engr Gp:

(a) Spt 20th Inf Div with one engr bn.

* * * * *

h. Corps Reserve:

(1) 23d Armd Div: * * *

* * * * *

4. ADMINISTRATION AND LOGISTICS

* * * * *

b. Allocation of nuclear weapons for 14 July 19--

(1) 20th Inf Div: 4 ALFA, 2 BRAVO, 1 CHARLIE.

* * * * *

The liaison officer from the 2d British Infantry Division (right flank unit of the British III Corps) indicates they will attack at the same time as the 20th Infantry Division.

The G4 states that there are no major changes in Administrative Order 8 which was issued yesterday. Fragmentary orders have been issued to accomplish any additional tasks. The division ammunition officer is moving to the vicinity of Babcock. Division trains will be prepared to move on order.

The division artillery representative has furnished the artillery paragraph which indicates the organization for combat of the artillery units. The fire support plan will be completed in time to be dispatched with the order. Detailed target analysis indicates that all troops forward of Hill 500 must take precautions during the nuclear preparation. An additional safety line has been established south of Hill 450 for the on-call weapon to be used there. The preparation will begin at H-15 minutes.

Division engineer will support each attacking battle group with one company. The battalion (-) and the supporting battalion from corps will maintain the roads and perform other normal engineer work.

The signal officer indicates that Index 3 to the Signal Operating Instructions will be in effect. There is no need for a signal annex.

The next message reference number to be used is CG 41.

The Order

With a knowledge of the situation and the information contained in the plan above, the Assistant G3 can very quickly prepare the overlay type operation order. Figure 2 is the completed order as it would go to the troops. With the reproduction equipment currently available this order would be in the hands of the troops in ample time. Recall that a fragmentary order was issued at the completion of the commanders' conference, and many of the items in the order confirm instructions already known to the units.

Discussion of the Order

A discussion of the order will point up any new or radical technique changes. The heading certainly is not unusual or different. The most significant part is the date time group, which indicates the time the commanding general will sign the order, and also the effective time of the order.

Paragraph 1, the situation, deals with enemy forces, friendly forces, and attachments and detachments to or from the division. The information of the enemy is contained in an annex which is normal. Friendly forces include four general categories: higher, adjacent, supporting, and reinforcing. These are all included. A non-organic unit attached for the operation is listed under attachments and detachments. There are no organic units detached during this operation.

The mission paragraph states the task to be performed by the division and its purpose. This includes the WHO (division), WHAT (attacks), WHEN (140900 July), WHY (to seize Hill 450 and Vannville, and be prepared to continue the attack to the northwest) from the commander's decision.

The concept of operation contains the commander's amplification of the tasks involved in the execution of the mission. The concept should clarify the purpose of the operation and be stated in sufficient detail to ensure appropriate action by subordinates in rapidly changing situations, or in the absence of additional specific instructions.

Following the concept the major subordinate units are given their specific tasks. They are listed in numerical sequence by regiment, except for a unit totally in reserve at the time of the order which would be listed only under the reserve.

The division artillery could be organized for combat in almost as many ways as there are artillerymen. This order indicates only one such way. In effect, three composite battalions are formed, each with mixed batteries. The composition of each battalion is listed in the artillery paragraph. Two batteries, the 8-inch howitzer and *Honest John*, are kept under division artillery control.

The division reserve lists all the units in reserve and assigns such missions as are appropriate. In this situation another G3 may well have listed the two battle groups (4th of the 64th and 5th of the 65th) not in the initial attack as in reserve. Since they played a part in the scheme of maneuver they were not so listed in Operation Order 11. However, either way is correct.

Coordinating instructions contain items of control or coordination pertaining to two or more elements of the command. This is the proper place to amplify any troop safety measures not completely cov-

(Classification)

(No change from oral orders)

Copy Nr 2
20th Inf Div
PARKER (5532), TEJUNAS
131600 July 19--
CG 41

OpO 11

Reference: Map, TEJUNAS, 1:50,000, SAGE CITY and BABCOCK Sheets.

1. SITUATION

- a. Enemy forces. Annex A, Intelligence.
- b. Friendly forces.
 - (1) I Corps atk 14 July with 20th Inf Div on the W, 55th Inf Div in the center, 72d Inf Div on the E to seize the general line VANNVILLE--BATESVILLE. 23d Armd Div and 20 weapons in corps reserve.
 - (2) British 2d Inf Div atk in conjunction with division units.
 - (3) 61st FA Gp reinf 20th Div Arty.
 - (4) 534th Engr Gp spt div with one bn.
- c. Attachments and detachments. 2d Med How Bn (155-mm) (SF) 631st Arty remains attached.

2. MISSION

Div atk 140900 July; seizes Hill 450 and VANNVILLE; prepares to cont atk to the NW.

3. EXECUTION

- a. Concept of operation. Div penetrates the Aggressor position with nuclear fires, 2d BG, 62d Inf, and 3d BG, 63d Inf. Upon engagement of Aggressor forces in the vicinity of Obj 1 and 2, 5th BG, 65th Inf, and 4th BG, 64th Inf (Mech) will be committed to seize Obj 3 and 4. Armd carrier companies initially attached for the seizure of Obj 3 and 4 will be released to mechanize designated units. Hill 590 will be atk and neutralized with nuclear fires based on movement into VANNVILLE. On-call nuclear fires are available to neutralize Aggressor forces vicinity Obj 3. Initial div res consists of 1st BG, 61st Inf, and 2 ALFA and 1 BRAVO weapon, 1st Med Tk Bn (-), 1st Armor. A preparation will be fired beginning at H-15 min.
- b. 2d BG, 62d Inf: assist atk 5th BG, 65th Inf.
- c. 3d BG, 63d Inf: assist atk 4th BG, 64th Inf.
- d. 4th BG, 64th Inf:

Attached: Co D, 1st Med Tk Bn, 1st Armor
Co B, 20th Trans Bn
Atk on divO to seize Obj 4.
- e. 5th BG, 65th Inf:

Attached: Co E, 1st Med Tk Bn, 1st Armor
Co C, 20th Trans Bn
Atk on divO and seize Obj 3.
- f. Div Arty:
 - (1) 1st How Bn, 45th Arty

Btry B and E 1st How Bn, 45th Arty
Btry A, 2d Med How Bn, 631st Arty
Spt 2d BG, 62d Inf, prep to spt 5th BG, 65th Inf.
 - (2) 1st FA Bn, 46th Arty

Btry C and D 1st How Bn, 45th Arty
Btry A and E 1st FA Bn, 46th Arty
Spt 3d BG, 63d Inf, prep to spt 4th BG, 64th Inf.
 - (3) 2d Med How Bn, 631st Arty

Btry A, 1st How Bn, 45th Arty
Btry B and C 2d Med How Bn, 631st Arty GS.
 - (4) Btry C, 1st FA Bn, 46th Arty: GS.
 - (5) Btry D, 1st FA Bn, 46th Arty: GS.
 - (6) Annex B, Fire Support Plan.

- g. 1st Med Tk Bn, 1st Armor:
 - (1) Co D atch 4th BG, 64th Inf.
 - (2) Co E atch 5th BG, 65th Inf.
 - (3) Bn (-) div res.
- h. 1st Recon Sq, 21st Cav: maintain contact with 2d (BR) Inf Div and 55th (US) Inf Div.
- i. 20th Engr Bn: spt 2d BG, 62d Inf; 3d BG, 63d Inf; 4th BG, 64th Inf; 5th BG, 65th Inf, with one company each.
- j. Div Trains: prep to move to vic BABCOCK--PARKER.
- k. 20th Trans Bn:
 - (1) Co B atch 4th BG, 64th Inf.
 - (2) Co C atch 5th BG, 65th Inf.
 - (3) Prep to resume comd Co B and C to move additional groups.
- l. Div Res:
 - (1) 1st BG, 61st Inf.
 - (2) 1st Med Tk Bn (-), 1st Armor.
 - (3) On order move to fwd assy areas.
 - (4) Priority of employment zone of 4th BG, 64th Inf.
- m. Coordinating instructions.
 - (1) 4th BG, 64th Inf, and 5th BG, 65th Inf, release armd carrier co after arrival assault elements in obj area.
 - (2) 2d BG, 62d Inf, and 3d BG, 63d Inf, prep for atk of armd carriers to cont atk after seizure of Obj 1 and 2 to destroy bypassed Aggressor or to cont atk beyond Obj 3 and 4.
 - (3) Troop safety.
 - (a) Troop forward of ASL 1 take normal precautions during nuclear preparation, H-15 to H-10 min.
 - (b) 4th BG, 64th Inf, and 5th BG, 65th Inf, report estimated time of arrival ASL 2, cross ASL 2 with div approval only.
 - (4) EEL. What natural or artificial obstacles or barriers exist within the division zone? What are their nature or extent? Special attention to the VANNVILLE area.

4. ADMINISTRATION AND LOGISTICS

AdminO 8.

5. COMMAND AND SIGNAL

Index 3, SOL.

Acknowledge.

NICHOLS
Maj Gen

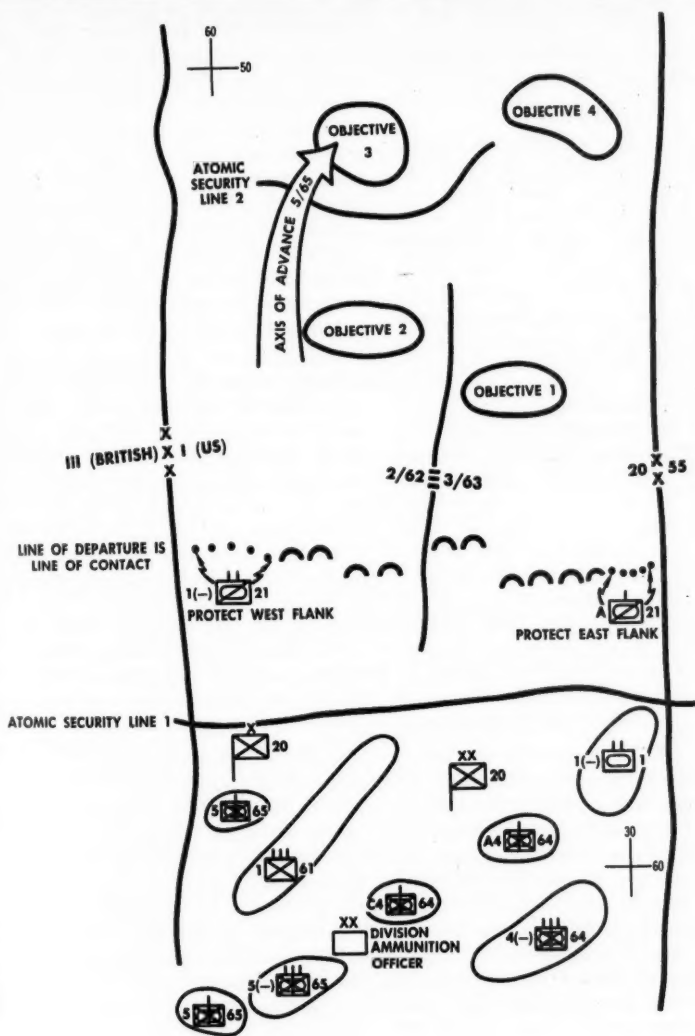
Annexes: A--Intelligence
B--Fire Support Plan

Distribution: A

55th (US) Inf Div
2d (BR) Inf Div
61st FA Gp
534th Engr Gp
23d Armd Div

OFFICIAL:
/s/ Gray
GRAY
G3

(Classification)



OVERLAY TYPE OPERATION ORDER

FIGURE 2.

ered in the unit standing operating procedure.

Paragraphs 4, 5, and the ending employ the same techniques as in previous years.

The Overlay

The use of an overlay promotes clarity, accuracy, and brevity by conveying instructions graphically. Items which can be placed on the overlay need not be repeated in the order, with the exception of the mission which must be written in full. Note that the part of the mission of the 1st Squadron, 21st Cavalry which appears on the overlay (flank protection) is not repeated in the body of the order.

Conclusions

It should be apparent that there is nothing new or different in the technique of preparing the operation order. There

should not be since the techniques prescribed for use throughout the Armed Forces of the United States are based primarily on international agreements. As such they are used by many of our allies, with different organizations, different designations, and different doctrine. The introduction of new organizations, new designations, and a complete integration of nuclear fires and maneuver into one attack plan are accomplished in Operation Order 11. However, the same general techniques used in recent years were applied to indicate the desired instructions.

Techniques, in their proper place, are a valuable aid to the staff officer; however, it is well to remember that they are merely a means to an end, and a tool by which decisions and tasks can be translated into instructions.

A sweeping reorganization of our airborne and infantry divisions, reflecting years of work and thought on the part of Army planners, has been in progress for some time. This reorganization is designed to assure maximum effectiveness in the employment not only of the weapons and equipment now available, but also of those which will become available in the years ahead.

The new Pentomic Airborne Division with its five battle groups is the first divisional size unit to be developed that is entirely air transportable with current equipment in available types of aircraft. The new Pentomic Infantry Division also has five battle groups which can be moved by strategic or tactical aircraft, and due to new equipment its ground mobility is far greater than that of the infantry divisions of World War II and Korea. The new Army Missile Commands being organized at the present time will add notably to the streamlined strength and effectiveness of our combat forces, and will permit ever-increasing flexibility in the employment of powerful atomic support weapons. These commands are patterned after the Army's Southern European Task Force which now backs up NATO divisions with *Corporal* guided missiles and *Honest John* rockets.

Secretary of the Army Wilber M. Brucker

GUERRILLA WARFARE

Lieutenant Colonel Anastase Balcos, *Greek Army*
Student, U. S. Army Command and General Staff College

This account is based upon the personal experiences of the author as a member of the Greek guerrilla force during the Axis occupation and later as a member of the Greek National Army combating Communist guerrilla units.—Editor.

THE war of the future conceivably could be fought as a combination of atomic and guerrilla warfare. The dispersed formations adopted in any atomic war and the long lines of communication in the mobile battles of the future will provide excellent opportunities for the development of guerrilla forces and their successful employment. This becomes even more probable since it is apparent that a nation lacking atomic weapons will, of necessity, rely heavily on guerrilla warfare.

In this field Greece has had considerable experience, differing from other countries due to the locale of the operations.

After heroic resistance, Greece was forced to succumb to overwhelming forces, and was occupied by the Axis armies in the spring of 1941. Approximately a year from this date, a resistance movement was in full swing. The many activities within this movement became the core for the creation of guerrilla warfare and enabled Greece to continue her active participation in the war until the surrender of the Axis forces.

Unfortunately, the end of World War II did not bring peace to Greece. The

young Greek Army had to fight again, this time against the Communist guerrilla forces. This added experience came to an end in 1950 resulting in complete defeat of the Communist forces.

Creation of Guerrilla Forces

The experiences of guerrilla tactics in past wars plus those of World War II now provide all armies an abundance of knowledge of the procedures and phases through which the guerrilla forces may be created. Therefore, this discussion will be confined to the characteristics of such warfare in the mountainous terrain and under the particular conditions existing in southeastern Europe.

In that area, so vital for the defense of the free world, the rapid or slow development of guerrilla forces, the probabilities of their survival, and their final predominance over their opponent depend upon a number of factors. Included are the political situation in the country, the effectiveness of the guerrilla propaganda, the assistance of the proguerrilla underground organizations, the assistance coming from countries ideologically allied to the guerrilla assistant, and the stature of their opponent.

The materialization of the decision to create guerrilla forces, as the means to impose our will upon the opponent, is facilitated if above factors are favorable. The first small guerrilla teams require neither officers of military background nor extensive economical resources to survive.

Dispersed formations adopted in any atomic war and the long lines of communication in the mobile battles of the future will provide excellent opportunities for development and employment of guerrilla forces

Persuading a number of active and bold cadres, who have the will to impose their "cause," to leave the towns and go into hiding to the mountains is the first step and forms the nucleus of the future guerrilla forces. It is natural that the existing authorities will not realize the extent of the danger from this action, thus allowing the already created basis of the future guerrilla formations to develop unrestricted. To stop this development requires considerable military forces which the government probably would be unwilling to undertake in the early stages.

Since the creation of guerrilla forces is so easy and their maintenance relatively inexpensive, one may wonder why their use is an exception in the history of revolutions, and not the rule. This happens for two reasons:

1. Their creation is not always the result of a sound decision since they seek members and resources mainly from the countryside.

2. Their final domination is extremely uncertain since they develop slowly and their opponent usually has the necessary time to determine the methods and means to annihilate them.

The first step in organizing a guerrilla movement is the "net." The formation of an underground organization, usually

Lieutenant Colonel Anastase Balcos, Greek Army, was graduated from the Greek Cadets' School in 1938. He also attended the Greek War College; The Infantry School, Fort Benning; American Special Weapons School, Germany; and the British Mountain Warfare School and the British Secret Intelligence School in England. He was a company commander in the Albanian Campaign during the Greco-Italian War; became a National guerrilla battalion commander in 1942-45 during the Axis occupation of Greece; and in 1948-50 served as battalion commander in the National Greek Army during the Communist revolution. He has held many important staff positions and prior to assignment to Fort Leavenworth was Chief of Plans Section, G3, Hellenic Army General Staff.

called "net," is vital to the future of the effort. The agents of the "net" are needed to perform the duties of recruiters of guerrillas, go-between's, and collectors of money and equipment. The agent in the countryside will have the important duty of receiving the cadres from the towns, and of providing food, hiding places, and guides. When the number of initiated agents in the countryside is considered satisfactory—and it is, if there is at least one agent in each of the key villages—then follows the organization of the first small teams of guerrillas.

It is essential that there is simultaneous organization of as many teams as possible in areas fairly distant, one from the other. This provides the advantage of increased security during the initial stage of guerrilla development, since it prevents the easy concentration of opponent forces in just one area and the resulting annihilation of the teams still unfamiliar with guerrilla tactics.

The first organized teams hide during the day and unfailingly change their hiding places each night. They are fed and guided on all their movements by the agents. They make secret contacts with the leading elements in the area and try to initiate them. A great deal of the success of the guerrilla movement depends on the initiation of these local personalities who have a tremendous influence on the other inhabitants.

The psychological effect which the organization of the first teams will have on the inhabitants of an area is great. The presence of armed teams moving secretly at night inevitably becomes known as it is whispered among the peaceful peasants of the mountain villages. In the case of a population hostile to the existing authorities, an atmosphere of tension and hope is produced among the inhabitants as well as fear to the small gendarmerie and security army stations which represent the authorities on the mountains. This

atmosphere is very favorable to the guerrilla, and is the proper psychological environment to shift the population to the guerrilla's side by initiation of as many as possible of the leading local personalities.

Surprise attacks and ambushes against the opponents' security stations and patrols then follow. To avoid annihilation these units will be forced to withdraw from the mountain villages to the towns or required to join the guerrillas. This action will diminish the difficulties to the ease of movement of the guerrilla force and increase the influence which the guerrilla propaganda has on the population. Later, the stronger security forces also will be attacked and will be forced to withdraw to larger towns. Eventually, the entire area will become what the guerrillas call a "free area" which means that no enemy forces are permanently stationed. Of course, a strong military unit can enter that "free area," but it will not succeed in engaging a guerrilla unit during the initial phases of the guerrilla development, although it may be harassed by being fired upon sporadically.

During this phase of organization the guerrillas confront their enemy's mopping-up operations mainly by concealment. On the other hand, the existing authorities usually react very slowly to the quickly developing situation since a large-scale mobilization or the concentration of strong forces—which is the only solution to the problem—is not always feasible. The authorities usually withdraw their military forces from the less troublesome areas and concentrate them in others in order to mop up successively the areas which are the most dangerous. The guerrillas react to this by infiltrating to some adjacent quiet sector while the guerrilla movement in the areas stripped of military forces develops with greater ease.

At the end of this initial period of development the guerrilla forces are organ-

ized into small, light detachments with full knowledge of guerrilla tactics. The guerrilla detachments do not have a specific organization, but are tailored to the conditions existing in the area. Their equipment is at first sought in the villages where the peasants have the habit of keeping weapons, and later it is obtained as a result of booty. More equipment, perhaps, can be bought in towns by the supporting organizations or can be brought in from abroad.

The Greek National Guerrilla Forces underwent a development as described here during 1942 and the first half of 1943. The Communist guerrilla forces in Greece developed along similar lines during 1946 and 1947.

Postorganization Problems

The problems which confront guerrilla forces during their organization period are mainly two—training of their officers and recruits and the increasing requirement of equipment and supplies. Formal education is not a prerequisite for officers trained in the conduct of guerrilla warfare. Even though lacking in such education, bold and tough individuals, fanatic to the "cause," can very well succeed. A stern critique after each operation constitutes the best training for their further development and the martinet discipline renders the functioning of command an easy matter.

A more serious problem is the increasing need of huge quantities of various equipment and supplies due to the greater number of men and the corresponding increase in consumption rate. But this is hardly a problem of the guerrilla military command. The political authorities behind the guerrilla movement or the guerrilla allies are responsible for furnishing the necessary quantities of equipment and supplies.

Other problems confronting the guerrilla command are:

1. Extension of mobilization, by force, if necessary.

2. Organization of new units.

3. Organization of the noncombatant population in paramilitary formations of some type, such as service units, reserve units, and information centers.

Upon completion of the organization of the necessary forces, full-scale operations start against their opponent. The nature of these operations depends upon the situation in each particular case. It may be a typical guerrilla operation or it may resemble a regular type war.

Guerrilla activities during this period may be summarized as follows:

1. Commando type raids into the area controlled by the opponent.

2. Operations to extend the "free" areas.

3. Sabotage and mine laying operations.

4. Attacks and ambushes against bivouacking or moving enemy units.

5. Confronting mopping-up operations.

6. Full-scale attacks against the opponent's weak points.

The methods employed by the guerrillas in confronting mopping-up operations are very interesting. The simplest of these methods—the one employed by the patriots in Cyprus in confronting the British—took the following form. The guerrillas disbanded their units temporarily, dispersed and hid the material into numerous prearranged hiding places, and concealed the wounded. The men returned to their villages pretending to be innocent workers or, if necessary, concealed themselves near their homes. The wounded were placed in two's or three's in appropriate hiding places with sufficient food and water, and their care entrusted to the local guerrillas. The entire guerrilla organization was reestablished immediately after the mopping-up enemy units departed. This method, although simple, cannot succeed unless the guerrillas are highly disciplined and de-

voted, so that they will not take the opportunity to desert to the enemy. Neither can it succeed unless the enemy lacks information as to the identity of each individual member of the guerrilla forces, and the exact location of the supply dumps. Another weak point of this method is that continued occupation by enemy forces of an area in which guerrillas are in hiding finally will result in the definite disbandment of the guerrilla units.

If the foregoing conditions do not pertain, then the method of confronting the enemy must take a different form. Three things are necessary to succeed—able guerrilla commands; a nearly perfect intelligence organization; and a sound plan. The actions taken for such an operation are chronologically as follows:

1. Deprive the opponent of the knowledge of the guerrilla's disposition, strength, composition of units, and intentions by frequent movement and implanted rumors.

2. Obtain early warning of impending enemy actions and spot the enemy concentrations by skillful use of the intelligence organization. Based on the enemy disposition study the probable directions of the enemy invasion and take preliminary measures such as the secret distribution and concealment of the stocks of equipment, ammunition, and food.

3. Based on the initial information and what is later collected, work out a sound plan for breaking through the enemy encirclement.

4. When the enemy columns start entering the "free" area, keep the main guerrilla force in reserve, have light guerrilla detachments confront the enemy by using a combination of offensive action, short defense on defiles, retrograde movements, and infiltration.

5. If these actions prove insufficient to turn the enemy back, infiltrate the main guerrilla force to the enemy rear; or if the infiltration is difficult, attack the weak-

est spot of the enemy disposition and break through to an adjacent quiet area. In the area evacuated by the main guerrilla forces, such forces are left behind as are considered necessary to harass the enemy, retain the influence upon the population, keep the information nets functioning, and to take care of the hidden dumps and casualties until the mopping-up is over and the departed guerrilla forces can return.

6. In addition to the actions described here, guerrilla units in distant sectors of the country should undertake offensive action against vital enemy points, causing the enemy force to withdraw in order to support the garrison being attacked.

Guerrillas as a Military Force

If the guerrillas have to impose their will upon their opponent with no military assistance from outside the country, they must become military themselves and start operating like a regular army. This is the most critical of all the phases of a guerrilla development. The tasks of the guerrilla forces now are the seizure and permanent occupation of the enemy camps and fortified towns, and the strict denial of the areas under guerrilla domination to the enemy. The guerrillas now must start their new tactics by establishing a base area usually on the border and on their lines of communication to a friendly country and, by continuous offensive operations, extend this area until the occupation of the entire country is completed.

It is apparent that the application of such strategy results in the loss of the normal guerrilla flexibility. By the nature of the new tactics, and the burden of the heavier equipment, the guerrilla formations are rendered slower in offensive or more cumbersome in defense. Their tactics more closely approach the orthodox military character.

The lack of cadres and technical personnel, coupled with the limited capabil-

ity of organizing artillery, engineer, and air force units, restricts the guerrilla conduct of orthodox operations. The Communist guerrilla forces in Greece underwent a similar situation during the years 1948-50 when they tried to defend permanently the area of Grammos and Vitsi mountains along the Northern Greek border. That attempt led to their final defeat.

Elimination of Guerrilla Forces

The annihilation of a developing guerrilla movement constitutes a complicated operation. First, plans should be made to deprive the guerrilla forces of the assistance coming from the local populace, as well as help from abroad. Second, plans must be formulated for the destruction of the guerrilla forces by military action.

The means to solve the first part of the problem are:

1. Use of propaganda.
2. The discovery and internment of the underground leaders of proguerrilla organizations, as well as the "go-between's and suppliers."
3. A gradual organization and arming of the antiguerrilla forces.
4. Development of plans to close the guerrilla supply routes, the borders and coasts, and the denial of airdrops for supplies.

Although the methods suggested may seem very simple, their implementation is extremely difficult where the population is friendly to the guerrillas. These methods are useless unless they are combined with extremely severe suppressive measures against the local population. The suppressive measures are not always politically wise.

To deal with the second part of the problem, a means must be found to:

1. Establish a proper intelligence and counterespionage organization.
 2. Mobilize a sufficient fighting force.
 3. Use the proper fighting tactics.
- Antiguerrilla tactics will not be dis-

cussed further since they are sufficiently covered in existing field manuals. However, there is one point which needs further analysis.

That point is the virtual impossibility of annihilating guerrilla forces by use of military power alone due to the impracticability of covering all areas at the same time.

In Greece the problem was solved by "immunizing" the mopped-up area through the use of local inhabitants. The people occupying the villages were organized into part-time working platoons, companies, and battalions. The military forces also remained in the area to offer elementary training in the use of arms as well as instruction in fortification of the villages. The tactics of these local units were very simple. They defended their own villages and the significant passes in the area until nearby military reinforcements could arrive. As this type of organization progressed and became more and more efficient, the military units of the area gradually departed.

Obviously, a development such as described here is impossible where the guerrilla forces comprise a part of a liberation movement against foreign forces oc-

cupying the country. Here, it would be difficult to turn the population against their own compatriots fighting for liberty. The Germans during their occupation of Greece, lacking other means to undo the existing links between the population and guerrillas, employed extremely severe suppressive measures against the population. By so doing they attempted to arouse the inhabitants' indignation against the guerrillas for provoking the enemy and, therefore, being responsible for the suffering of the Greek civilians. This method failed completely due to the heroic attitude of the Greek people.

Conclusions

Guerrilla operations must be expected in any future war. An army must be ready to crush guerrilla movements as well as employ their tactics. Guerrilla forces are strong, simple, easily created, and relatively inexpensive. Elimination of guerrillas is extremely difficult and cannot be accomplished without resorting to mobilization measures and repressive actions against the population.

Guerrilla forces, effective as they are, will never militarily dominate their opponents without generous assistance from their outside allies.

The Army is planning for any possible future war without being mentally handcuffed to the last war. Not only has science developed an arsenal of superweapons which are continually modifying our concepts for the tactical employment of our conventional forces against an enemy, but it is opening an area of planning for the use of enemy-subjugated people against their oppressors.

Major General Orlando C. Troxel, Jr.

KEEP IT SIMPLE

Lieutenant Colonel George D. Carnahan, *Ordnance Corps*
Faculty, U. S. Army Command and General Staff College

KEEP it simple! This is the plea of commanders. In making a decision today, commanders must consider factors that were unheard of 15 years ago. Many of the factors are complex and have mathematical and engineering aspects.

The trend of the capabilities of personnel is in the opposite direction, that is, less able to handle complex factors and equipment. The deemphasis on mathematics and the physical sciences which began in the "thirties" has resulted in many high school and college graduates unable to cope with the simplest mathematical concepts. There has been a lack of training in the rigorous, precise, and logical thought processes required in solving mathematical problems. Beware of the person who covers up his own deficiencies with the phrase, "That's nothing but grocery store arithmetic." What he really means is, "I do not have the training to handle such concepts." The current Army is highly technical; it demands a large degree of skill in its specialists. Unfortunately, these same specialists are in great demand by private industry, and in peace the Army never will have enough of this type personnel.

Personnel Problems in Industry

Industry, too, is having its difficulties in obtaining men who can perform mathematical calculations and solve equations. Steps have been taken in industry to com-

pensate for scarcity of skilled people. In the textbook, *Graphical Aids in Engineering Computations*,¹ the authors state:

Much of the computation in engineering and commercial offices involves repeated solution of certain formulas or equations. To aid in these solutions, mechanical and graphical devices are frequently used. In engineering offices the slide rule is most commonly employed, but the alignment chart, which has many advantages, is coming into wider use. With alignment charts less time is required and there is less likelihood of error than in the use of the slide rule or other methods. Less mental effort is required, and the solution of problems can often be delegated to someone with comparatively little training.

The last two sentences, dealing with the advantages of the alignment charts, are of importance to the Army. If complex problems can be solved in less time, with less likelihood of error, using less mental effort, by someone with comparatively little training, then the Army can use such charts to advantage. Within the Army today there are officers who have had advanced technical training. These officers can tackle the problem of simplifying complex data for use by relatively untrained men.

¹ *Graphical Aids in Engineering Computations*. By Hoelscher, Arnold, and Pierce. McGraw-Hill Book Co., Inc. New York. 1952.

Intricacy of modern military equipment is matched by a complexity in procedures. Measures must be taken now to simplify such procedures in the interest of the efficiency and timeliness of military operations

Nuclear Warfare Problems

The field of the effects of nuclear weapons embraces many of the new factors which a modern commander must consider.

has received. The amount of nuclear radiation received varies with the yield of the weapon, the distance from ground zero, and the protection afforded to the indi-

<i>Acute dose (roentgens)</i>	<i>Probable effect*</i>
0 to 50	No obvious effect, except possible minor blood changes.
80 to 120	Vomiting and nausea for about 1 day in 5 to 10 percent of exposed personnel. Fatigue but no serious disability.
130 to 170	Vomiting and nausea for about 1 day, followed by other symptoms of radiation sickness in about 25 percent of personnel. No deaths anticipated.
180 to 220	Vomiting and nausea for about 1 day, followed by other symptoms of radiation sickness in about 50 percent of personnel. No deaths anticipated.
270 to 330	Vomiting and nausea in nearly all personnel on first day followed by other symptoms of radiation sickness. About 20 percent deaths within 2 to 6 weeks after exposure; survivors convalescent for about 3 months.
400 to 500	Vomiting and nausea in all personnel on first day, followed by other symptoms of radiation sickness. About 50 percent deaths within 1 month; survivors convalescent for about 6 months.
550 to 750	Vomiting and nausea in all personnel within 4 hours from exposure, followed by other symptoms of radiation sickness. Up to 100 percent deaths; few survivors convalescent for about 6 months.
1,000	Vomiting and nausea in all personnel within 1 to 2 hours. Probably no survivors from radiation sickness.
5,000	Incapacitation almost immediately. All personnel will be fatalities within 1 week.

FIGURE 1.

* Table 11.57, Department of the Army Pamphlet 39-3, *The Effects of Nuclear Weapons*.

Blast, thermal, and nuclear radiation effects all result in casualties. The least familiar of these three effects is that of nuclear radiation. A man in the vicinity of a nuclear detonation is either blown about, or he is not; a man is burned, or he is not; his status can be determined almost immediately. His chance of becoming a casualty due to nuclear radiation is not so readily determined. One means of ascertaining his probable status is to estimate the dose of nuclear radiation he

receives. The effect of an acute whole-body radiation dose is indicated in Figure 1.

Illustrative Examples

Assume that men are in the open 1½ miles from a 10-kiloton air burst. The answer to "How much gamma radiation have these men received?" needs to be made available quickly. The present procedure for obtaining the answer is as follows:

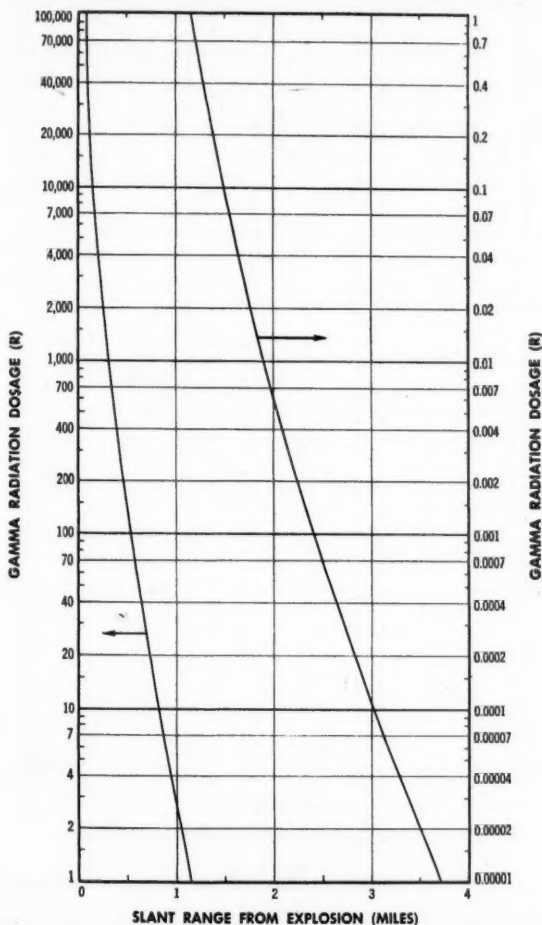
1. From Figure 2, for a distance of

1 1/4 miles, read a gamma radiation on the *right* scale of about 0.5 roentgen for a one-kiloton yield.

2. From Figure 3, for a 10-kiloton yield, read a scaling factor of about 10.5.

3. Multiply the scaling factor of 10.5 by the dose of 0.5 roentgen for a one-kiloton yield to obtain a dose of 5.25 roentgens for the 10-kiloton burst.

Figure 4 cannot be used to estimate the dosage, other than to say "Less than 30



INITIAL GAMMA RADIATION DOSAGE FOR A ONE-KILOTON AIR BURST

FIGURE 2.

roentgens." Interpolating or extrapolating from Figure 4 is difficult due to the values assigned to each dosage line.

After repeating the operations described

Use of Alignment Chart

What can be done to simplify data by using an alignment chart is discussed in the remainder of this article. The chart

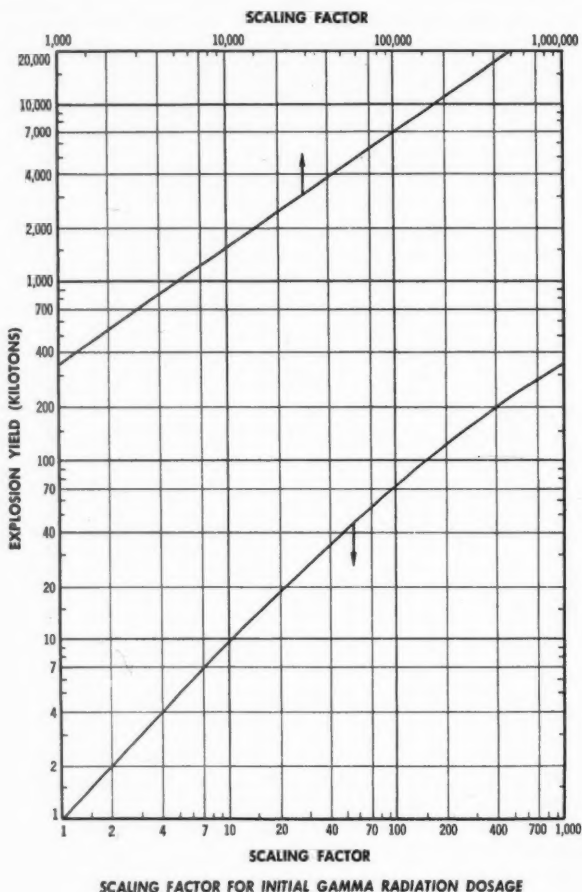


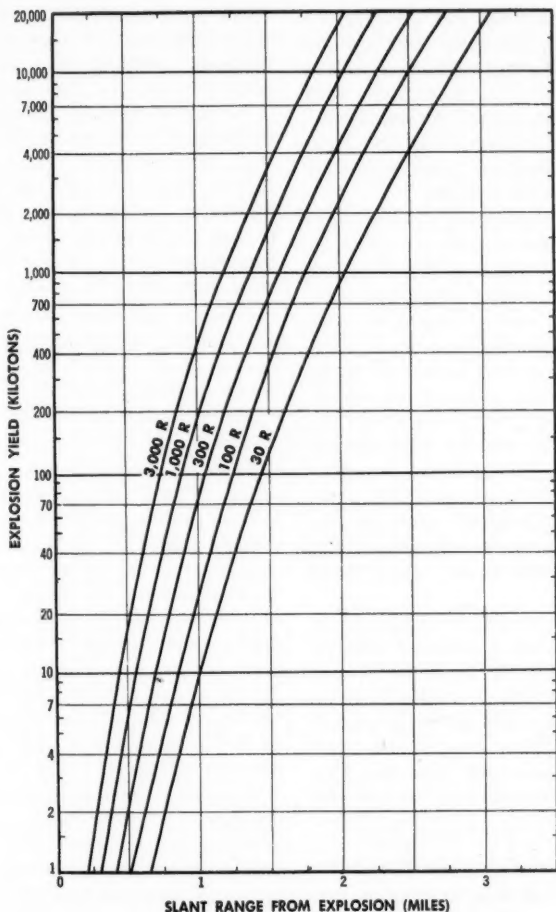
FIGURE 3.

above in solving problems, the feeling arises, "There must be an easier way to do this." An easier way usually is a simpler way.

will provide an easier method of estimating the initial gamma radiation dosage received. Such an alignment chart, Figure 5, was constructed with the basic data

taken from Figures 2 and 3. Use of the chart is simple. All that is required is the placing of a straight edge, or ruler, to

weapon and men in the open $1\frac{1}{4}$ miles away. What initial gamma radiation dosage was received? On Figure 5 place a



RANGES FOR SPECIFIED INITIAL GAMMA RADIATION DOSAGES

FIGURE 4.

intersect all three lines. Answers then can be read directly from the chart.

Example: Given a 10-kiloton air burst

ruler between 10 kiloton on the right scale and 1.25 miles on the center scale. Read a dose of about five roentgens on the left

scale. This dose is about the same value that was calculated earlier by reading a scaling factor from Figure 3, and a value for a one-kiloton yield from Figure 2, and then multiplying these two values together.

Example: How close can personnel be to a 10-megaton air burst and not get more than a 20-roentgen dose from initial gamma radiation? Lay a straight edge from 20 roentgens on the left scale to 10,000 kiloton (10 megatons) on the right scale; read a distance on the center scale of approximately three miles.

Note that all yields from one kiloton to 20 megaton (20,000 kiloton) are shown on one scale. The initial gamma radiation dose scale covers the range from one-tenth roentgen to 10 million roentgens. Distances from ground zero are from 0.1 miles to 4.0 miles. The entire picture of initial gamma radiation dose versus yield and distance from ground zero is shown on one chart which can be used by relatively unskilled personnel. The values of gamma radiation dosages read from this chart, together with the probable effect as read from Figure 1, give an indication of the military effectiveness of any men exposed to such a dose.

It has been suggested that the chart in Figure 5 be modified to show *probable effect* (such as 20 percent deaths, 50 percent deaths, and immediate incapacitation). This modification would limit the usefulness of the chart since the probable effect shown could be only that from one detonation and could not consider previous exposures to radiation.

Use of Protective Material

Figure 5 portrays dose received by personnel in the open. What about protected personnel? What dose will they receive? It is known that gamma rays are absorbed in the course of their passage through any material. Strictly speaking, it is not possible to absorb gamma rays completely. Nevertheless, if a sufficient thickness of

matter is interposed between the radiating source and a person, the exposure dose can be reduced. For a given thickness, the greater the density of the material, the more the exposure dose will be reduced. The term of measurement used, "half-value layer thickness," is that thickness of a particular material which absorbs half the gamma radiation falling upon it. Figure 6 is a representation of the half-value layer thicknesses. The total shielding between the left side of the first layer and the right side of the third layer is that of three half-value layers. Of the 400 roentgens hitting the left side of the left surface, only 50 roentgens will get through to the right side of the right layer.

Common materials likely to be available for shielding against initial gamma radiation from a nuclear explosion are steel, earth, concrete, water, and wood. Approximate half-value layer thicknesses are as shown in Figure 7.

From this table it can be seen that 4½ inches of steel will admit only ¼ of the initial gamma radiation falling on the outside (each 1½ inches will reduce the dose by ½; since there are three of the half-value layer thicknesses contained in the 4½ inches of steel, the gamma radiation passed through will be equal to ¼; that is, $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$). Similarly, 18 inches of concrete will admit only ¼ of the outside dose. When the protection is 15 inches of earth, ¼ of the outside dose will get through ($\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$).

Example: Given personnel protected by 30 inches of earth and 1½ miles from a two-megaton air burst (two megaton = 2,000 kiloton). What dose of initial gamma radiation will they receive? On Figure 5 place a ruler between 2,000 kiloton on the right scale and 1.5 miles on the center scale. Read a dose of about 1,600 roentgens on the left scale. This is the dose received by men *in the open*. A protection of 30 inches of earth represents four half-value thicknesses and will allow only

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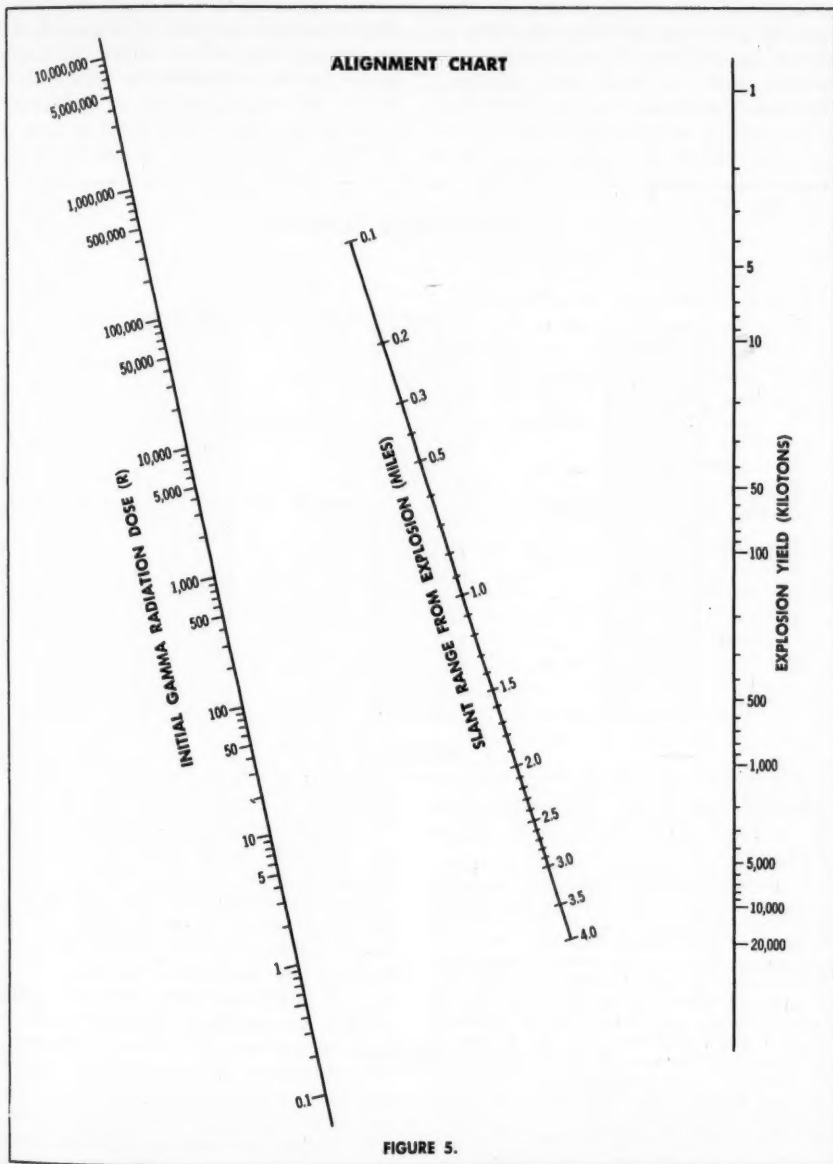


FIGURE 5.

1/16 of the radiation to get through ($\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = 1/16$). The total dose received by the men is then 1/16 of the outside dose, or only 100 roentgens. Whereas, the outside dose is 1,600 roentgens and will result in probably no survivors, the dose to the men protected by 30

Various modes of protection could be indicated on the left scale of Figure 5. As an example, if a foxhole admits $\frac{1}{4}$ of the initial gamma radiation, the figures now on the left scale could all be divided by four and the chart would apply to men in foxholes, rather than to men in the open.

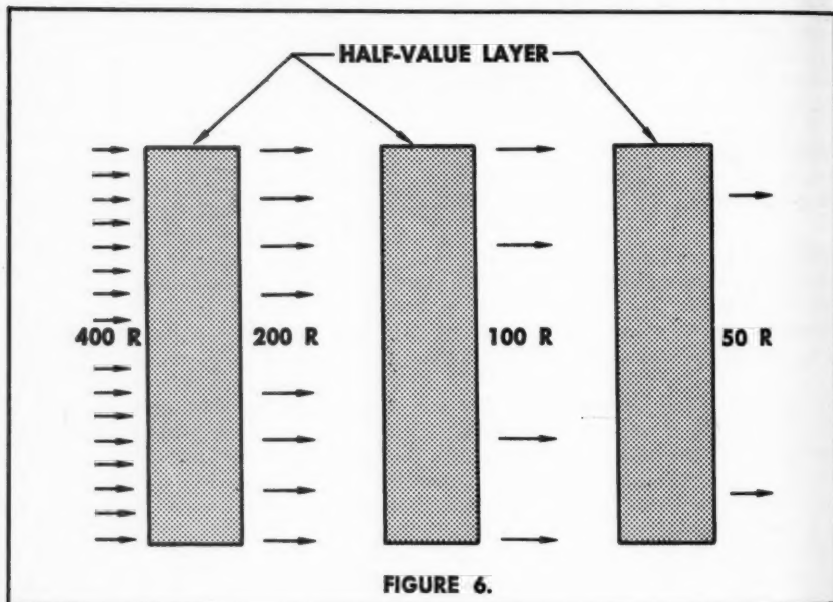


FIGURE 6.

inches of earth is only 100 roentgens and the probable effect is one of no serious disability.

Lieutenant Colonel George D. Carnahan was graduated from the United States Military Academy in 1940. He attended Rensselaer Polytechnic Institute where he received a Master's Degree in Mechanical Engineering in 1949. He was a guided missile project officer for the Nike and Honest John projects at White Sands Proving Ground from 1949 to 1951. He served in the Ordnance Section of the Korean Communications Zone and as Chief, Ordnance Section, Headquarters, Central Command, in Japan from 1952 to 1954. Upon completion of the 1955 Regular Course of the U. S. Army Command and General Staff College, he was assigned to the faculty.

Similarly, if a tank allows only $\frac{1}{4}$ of the dose to get through, all the figures now on the left scale would be divided by eight and the chart would apply to men in tanks.

Since this article is a basic approach to the simplification of the complex data of initial gamma radiation, no effort has been made in this discussion to account for the nuclear radiation from neutrons, or to consider the combined radiation dose from both gamma rays and neutrons. However, other alignment charts are being devised to indicate these combined doses. Still other alignment charts are being made to consider protection such as buildings, foxholes, tanks, and forests. Given the weapon

yield and the distance from ground zero, the amount of nuclear radiation received can be estimated in a few seconds from the varied types of alignment charts.

Test Problems

Four problems are presented to illustrate the fact that alignment charts are simple to use. (Use Figures 5 and 7 for computation. Answers will be found on page 108.)

Problem 1. Given: A 100-kiloton air burst and personnel one mile away. What dose of initial gamma radiation

Material	Half-value thickness (inches)
Steel	1½
Concrete	6
Earth	7½
Water	13
Wood	23

FIGURE 7.

will be received by personnel in the open? By personnel protected by 15 inches of earth?

Problem 2. What is the smallest yield weapon that will cause immediate incapacitation to personnel in the open from initial gamma radiation (5,000 roentgens are required) out to a distance of one mile from the burst?

Problem 3. Given: The maximum allowable dosage of initial gamma radiation is 15 roentgens; a six-kiloton nuclear detonation is planned. How

near can personnel be in the open without exceeding the specified dosage? How near can they be if they are protected by 4½ inches of steel?

Problem 4. Given: Men are in the open 1½ miles from a 50-kiloton nuclear weapon burst. A second nuclear detonation of one megaton (1,000 kiloton), 1.8 miles away from the men, occurs three minutes later. By the time this *second detonation* occurs, the men have taken advantage of protective cover, and receive only one-tenth of the initial gamma radiation from this burst. What total dose of initial gamma radiation have the men accumulated from these two nuclear detonations?

Conclusion

The use of alignment charts is being extended to include the blast effects and thermal radiation from a nuclear detonation. In each case, a simple alignment chart will provide an answer involving less time and mental effort, and with less likelihood of error. Once the answer is available, the commander can use it as a basis for making decisions. The shorter the time required to develop an answer, the quicker the commander can make his decisions.

Department of Special Weapons at the U. S. Army Command and General Staff College is making progress in the elimination of many detailed calculations formerly required in estimating effects of a nuclear detonation. Development of the alignment chart is but one example of this simplification.

MOVING?

If you are moving, please notify the MILITARY REVIEW, Fort Leavenworth, Kansas, of your change of address. Be sure to include your name, *old* address, and *new* address.

MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Speedy Aircraft

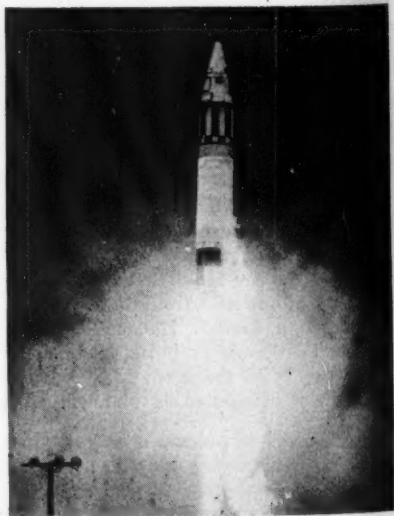
A carrier-based aircraft that can travel at twice the speed of sound has been ordered into production. The new fighter, designated the *F8U-3*, incorporates some of the features of the *F8U-1 Crusader* which at one time held the US national speed record of 1,015 miles an hour (MR, Oct 1956, p 69). The new *F8U-3* has been described as the first-line fighter in a new generation of all-weather Navy aircraft. It will be launched by catapult, and is designed to land in less than 300 feet on a carrier deck. Scheduled for flight tests in 1958, the *F8U-3* is planned for delivery to the fleet in 1960. It will be able to operate at the greatest altitudes used by bombers.

A jet bomber that will travel at speeds of more than 2,000 miles an hour is planned as a replacement for the *B-52* intercontinental jet bomber now in service with the Strategic Air Command. The aircraft, officially designated the *WS-110A*, is expected to be able to operate at altitudes of over 70,000 feet, and will be powered by high-energy "exotic" fuels. It probably will be several years before the new bomber can be developed and placed in service. The two long-distance jet bombers now in use by the Air Force—the *B-52* and the *B-47*—travel at speeds of about

600 miles an hour at altitudes of 40,000 to 50,000 feet.—News item.

Missile Units Planned

The formation of the first Air Force units to be armed with intermediate range



US Army Photograph
Army's Jupiter IRBM

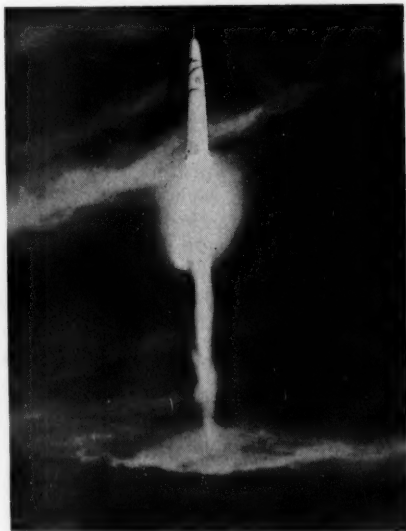
ballistic missiles has been announced. The two units, the 672d and the 864th Strategic

Missile Squadrons, will be armed with the Air Force's *Thor* and the Army's *Jupiter* missiles. Both of these missiles have been successfully tested and ordered into production. According to the Air Force, the two squadrons will be in training status and will not be equipped for some time. The Army will assist in training Air Force personnel on the *Jupiter* missile.

The *Jupiter* is a surface-to-surface IRBM with an estimated length of 60 feet, and a diameter of eight feet. It is equipped with an inertial guidance system, and its liquid propellant rocketdyne motor provides a thrust of 135,000 pounds. The

achieved a range of 2,700 miles in its most successful test.

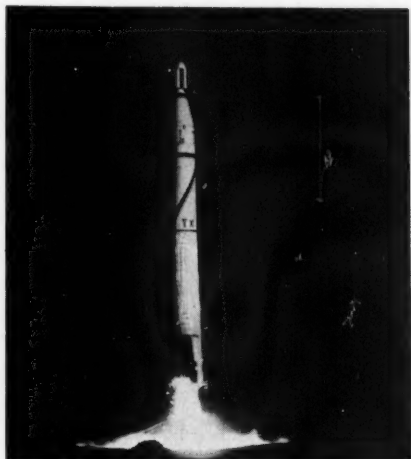
The *Jupiter C* is a three-stage test vehicle that has been used in the development of the re-entry nose cone to solve the



Official US Air Force Photograph
Thor is now in production

Jupiter is said to have an operational range of 1,500 miles, and achieves an altitude of 250 to 300 miles.

The *Thor*, another IRBM with inertial guidance, also uses a liquid propellant rocketdyne motor and is reported to have a speed of Mach 10. Although designed for a range of 1,500 miles, the *Thor* has



US Army Photograph
Jupiter C with re-entry nose cone

problem of air friction heating when a missile re-enters the earth's atmosphere. The *Jupiter C* has been fired for a distance of 3,600 miles in tests, and is the vehicle which launched the earth satellite, *Explorer*, or 1958 *Alfa*.—News item.

Speed Mark

A new straightaway world jet speed record of 1,207.6 miles an hour has been set by a *F-101A Voodoo* of the United States Air Force. The previous world record of 1,132 miles an hour was held by a British *Fairey Delta-2* (MR, Jul 1956, p 73). The *Voodoo* is 67 feet long and has a wingspread of slightly less than 40 feet. It is armed with four 20-mm cannon, three *GAR-1 Falcon* missiles, and 12 rockets. Powerplants of the *Voodoo* are two *J57-13* turbojet engines (10,000 pounds thrust each) with afterburners.—News item.

Mine-Detonating Device

A tank-mounted, mine-exploding roller is in use to clear pressure activated mines before the tank tracks are endangered. The roller, which can be assembled and



US Army Photograph

Tank-mounted land mine detonator

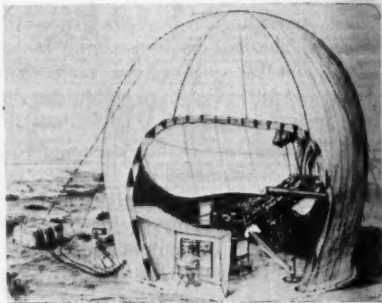
installed quickly by field personnel, is made up of a series of wheels four feet in diameter and six inches thick mounted on independent shafts or axles. It is fabricated of high-strength steel to withstand the shock of the exploding mines. The attachment does not hinder the fighting capabilities of tank weapons and may be jettisoned from inside the tank if necessary.—Official release.

Radar Progress

Recent developments in radar include a portable tactical system, a radar for amphibious control craft, a giant astronomical radar telescope, and an electronic weather machine.

The tactical early warning (TEW) system, developed for the United States Marines, is designated the *AN/MPS-21* and is said to be the first such instrument of comparable size and weight to provide three-dimensional data at extreme ranges. It is about one-quarter the size and weight of conventional systems and can be transported by helicopter, airplane, truck, or

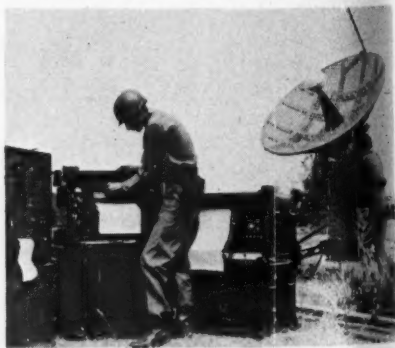
amphibious vehicle. The portable device can be brought into action within two hours of its arrival in a battle area. The



Marine's tactical radar set

dome like antenna of the device uses an inflatable, dual wall radome that is designed for use in any climate and can be heated or cooled as needed.

The electronic weather computer automatically figures high altitude weather reports from information radioed down by balloonborne weather stations. The sys-



US Army Photograph

Electronic weather computer

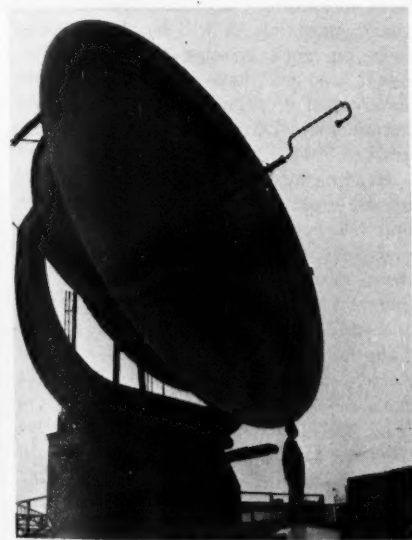
tem consists of an antenna which tracks the meteorological balloons and computers which instantaneously process the information received, such as pressure, humidity, temperature, and wind readings.

The radar for use on amphibious control craft is a modified version of the com-



Official US Navy Photograph
Amphibious control radar

mercial Mariners Pathfinder 1500. Targets displayed on the scope of this radar are said to be needle-sharp in definition.



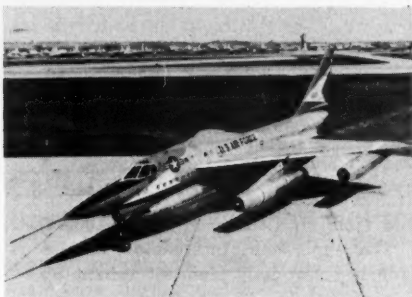
Official US Navy Photograph
Naval 600-inch radar telescope

The 600-inch-diameter radar telescope of the Naval Research Laboratory has been

used to make direct measurements of the distance between the earth and the moon.—Official release.

'Hustler' Reconnaissance System

The photographic reconnaissance system of the *B-58 Hustler*, the first such system to be designed and built under the "weapons system" concept, is carried in a detachable pod that can be interchanged for



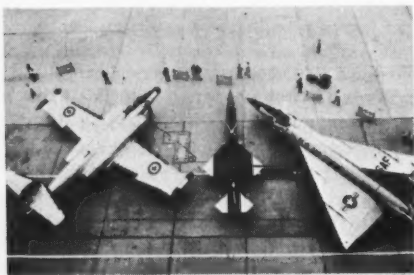
Pod-equipped *B-58 Hustler*

bombing or electronic countermeasure pod systems. A unique feature of the photo-reconnaissance system is its closed-circuit television which provides the photo-navigator with an unobstructed view of the forward terrain in sufficient detail to permit him to identify landmarks and targets. The camera control system functions automatically or can be controlled manually from a remote control panel within the aircraft. It controls the three cameras so that exposures are made at a rate which provides 55 percent overlap on each photograph for stereoviewing. An automatic exposure control on each camera selects the shutter speed and diaphragm opening to give the best photographs over a wide range of light conditions. Since the *B-58* is capable of speeds in excess of 1,130 miles an hour, the film in the cameras is moved during the taking of photographs to compensate for the forward motion of the aircraft and prevent blurring of the picture.—Commercial source.

'Bomarc' in Production

The first production model of the *IM-99 Bomarc* area defense missile has been delivered to the United States Air Force. The delivery marks the beginning of a production program designed to supply the *Bomarc* missiles and associated weapon system equipment to bases of NORAD—the North American Air Defense Command (MR, Nov 1957, p 71). The US Air Force is preparing to build *Bomarc* launching sites at existing airbases in the northeastern United States. The *Bomarc*, designed to destroy enemy aircraft and missiles long before they can reach their targets, has been undergoing exhaustive tests for over five years. It has made successful interceptions of remotely controlled target drones at a range of more than 100 miles and from an altitude of over 60,000 feet.

The supersonic interceptor missile is launched vertically from an automatically



CF-100, Bomarc, and F-102

opening launcher-shelter, is equipped with a target seeking system, and can carry either a conventional high-explosive or nuclear warhead. Top piloted interceptors of the NORAD system currently include the Canadian *CF-100* (MR, Nov 1956, p 80) and the United States *F-102*.—News item.

Shipbuilding Plans

The *Forrestal* class aircraft carrier *Constellation*, now under construction and expected to be completed in 1960, will be the last United States carrier to be con-

ventionally powered. The 60,000-ton carrier will measure 1,047½ feet long and will cost more than 150 million dollars.

Other ship construction planned includes the Navy's first atomic-powered aircraft carrier which will cost more than 314 million dollars and take four years



Nuclear attack aircraft carrier

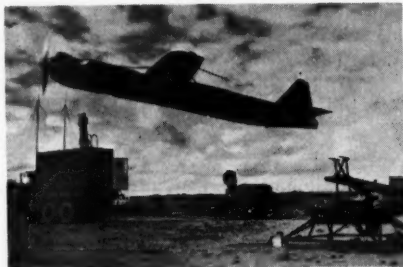
to build. It will displace 75,000 to 85,000 tons, and will be 1,088 feet long. The vessel is to be powered by eight atomic reactors containing sufficient fuel for five years' operation. It will be able to carry twice as much aviation fuel as the *Forrestal*, and will have an additional 4,000 square feet of flight deck space that will permit operation of more and larger aircraft.

Heavy cruisers scheduled to be guided missile craft are the *Albany*, *Fall River*, and *Chicago*. All other conversions now underway are on light cruiser hulls. The three heavy cruisers now mount 8-inch guns in triple turrets—two forward and one aft. Their new armament will be twin *Talos* launchers forward and aft, and twin *Tartar* launchers amidships. Six light cruisers now are being converted, five from the 1957 fiscal program and one from the 1956 program. These vessels will be equipped with missile launchers aft and conventional armament forward. Of this group of six, three will be armed with the *Terrier* and three with the *Talos*. The *Tartar* is a short-range, solid propellant homing missile that has been reported to have even better performance than the *Terrier*.

The *Long Beach*, the atomic-powered vessel that is the United States first warship designed from the outset to carry an all-guided missile armament, will join the fleet in October 1960. The *Long Beach* will have four atomic reactors in her powerplant.—News item.

Night Surveillance System

A small, rugged, lightweight camera mounted in a remotely controlled drone



US Army Photograph
RP-71 drone taking off

plane, the major component of the United States Army's new night surveillance system, will provide combat commanders with



KA-28 camera fits into an RP-71 drone

accurate low-level aerial photographs of enemy areas during the hours of darkness. The system includes 14 flash cartridges which are fired and ejected automatically.

The 17-pound KA-28 camera has no shutter in the ordinary sense, but makes a series of pictures, one after another, so that a terrain strip can be photographed



Jet drone is under development

by a sequence of extremely rapid flashes in a matter of seconds. A single 28-volt battery operates both the flash cartridge ejector and the camera system. The camera can be used in either a manned aircraft or a pilotless drone, and is mounted in an RP-71 or other radio-controlled aircraft for night reconnaissance.

Another report on pilotless aircraft indicates that the program of development of a surveillance jet drone is proceeding on schedule with highly satisfactory results.—Commercial source.

'Nike-Hercules' Training

The training of units in the operation of the *Nike-Hercules* surface-to-air missile will involve the conversion of *Nike-Ajax* units to *Hercules* battalions as well as the activation of new units. The training of instructor personnel has been completed, and key officers and technicians for some of the new units are receiving instruction at the Air Defense School at Fort Bliss, Texas. The training of the first *Nike-Hercules* battalion has been scheduled.

The *Nike-Hercules* is 27 feet long and weighs a ton. It attains a speed of over Mach 3, and utilizes a beam-rider command guidance system. The solid propellant *Hercules* can carry a nuclear warhead, and has a range of 70 miles.—News item.

FRANCE

Arms Reduction

A reduction of the French armed forces by 154,000 men—about 15 percent—is planned for 1958. The reductions will be effected in troop units stationed in France, Germany, Tunisia, and Morocco. Over-all defense expenditures will be reduced by about 120 million dollars. Construction projects to be affected include a 30,000-ton aircraft carrier, two escort vessels, and several types of aircraft.—News item.

Carrier Launched

The 22,000-ton *Clemenceau*, France's first modern aircraft carrier and the largest French warship built since 1939, has been launched. The *Clemenceau* is 945 feet long, carries a complement of 2,700 men, and can attain a top speed of 32 knots. It has an angled deck, two steam catapults, and is armed with twelve 100-mm automatic antiaircraft guns of a new design. It will mount 60 aircraft, including jets of the *Aquilon* type.

The *Aquilon* jet interceptor is the French-built version of the British *Sea Venom*. This aircraft is powered by a *Ghost 48 Mk. 1* turbojet engine and is capable of a maximum speed of 600 miles an hour.—News item.

COMMUNIST CHINA

Oil Refinery Completed

Completion of an oil refinery in the remote Tsaidam Basin has been announced. Since rail facilities are not available in this area the refinery products are shipped by truck to Lanchow to the east or Yumen to the north. A rail line between Tsaidam and Lanchow is planned for construction during the second five-year plan which begins in 1958. Yumen, the largest operating oilfield in China, has had a rail connection since 1956. Although petroleum production for the last year of the first five-year plan fell below expectations, China hopes to produce enough crude oil to

provide 50 to 60 percent of her requirements by 1962, and to be self-supporting by the end of the third five-year plan in 1967.—News item.

CANADA

Accent on Defense

Plans to build an intercontinental missile in Canada have been discontinued. Research and development in the missile field is to be concentrated on defense. The Canadian missile defense effort is being made in cooperation with the United States and Great Britain.—News item.

Rocket With Firecrackers

Aerobee rockets in use for International Geophysical Year research at Fort Churchill are equipped with high-explosive "firecrackers" to sound out temperatures and winds simultaneously. The special *Aero-*



US Army Photograph

Aerobee in Fort Churchill tests

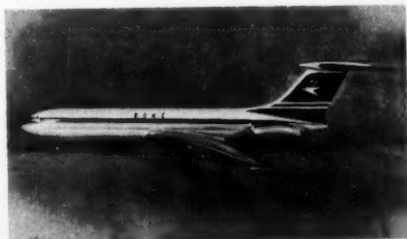
bees are loaded with 19 high-explosive grenades to be ejected from the rockets at predetermined altitudes. The blasts are heard by delicate sound-ranging devices

on the ground. The time it takes the sound to reach the ground is used in computing meteorological conditions.—Official release.

GREAT BRITAIN

Jet Civil Transport

Great Britain's newest jet airliner, the VC.10, will carry up to 150 passengers, and is in the 600 mile-an-hour class. Key features of the VC.10 are its outstanding takeoff performance and operational economy. Its four *Rolls Royce Conway* engines, which are mounted toward the rear of the fuselage, were especially developed for this



VC.10 has rear-mounted engines

aircraft. A fleet of 35 of the big jets has been ordered for use on African, Australian, and Far Eastern air routes. Deliveries of the VC.10 are expected to begin in 1963.—News item.

Rebuilt Carrier Joins Fleet

Great Britain's *HMS Victorious*, a 30,000-ton aircraft carrier, has been rebuilt completely and rejoined the operational fleet. The big vessel now has a fully angled flight deck, steam catapults, and is equipped with a mirror landing system. Its 775-foot-long flight deck is set at so great an angle that it overhangs the ship's side by more than 35 feet. The vessel will accommodate the new jet attack aircraft, NA-39 (MR, Apr 1957, p 71), and will have the first operational squadrons of the *Scimitar* interceptors. It can attain a speed of 31 knots, and will carry 72 aircraft including types armed with the *Fire-*

streak air-to-air guided missile.—Official release.

River Crossing Equipment

The experimental *Igloo* tent of the British Army weighs only 35 pounds, and can be erected by one man in four minutes. The framework of the *Igloo* is made up



Keystone Press Agency, Ltd Photograph
Igloo tent has inflatable frame

of inflatable tubes. The wire frame, canvas-covered cart in which the tent is carried is equipped with buoyancy bags for floating across rivers. A large wire basket,



Keystone Press Agency, Ltd Photograph
Lightweight amphibious cart

equipped with wheels for cross-country work, is capable of carrying three men in river crossing operations.—News item.

USSR

Portable Launcher

A mobile device for use in launching jet fighters is under test by the Soviet armed forces, according to a report. The portable catapult is said to be moved easily, and can be set up anywhere.—News item.

Atomic Submarines

According to the latest edition of *Jane's Fighting Ships* the Soviet Navy will be equipped with "underwater satellites" within four years. The "underwater satellites" are projected as atomic-powered submarines capable of carrying intermediate range ballistic missiles with a range of over 1,500 miles. The missiles, which are about 70 feet long and weigh 50 tons, are said to be improved versions of the German World War II V-2 rockets fitted with thermonuclear warheads. *Jane's* estimates that by 1961 the Soviet Navy will have 700 submarines, including the atomic-powered vessels.

The 1958 issue of the Swedish naval year book, *Marinkalendern*, states that the Soviet Navy probably has three atomic submarines, two in the Baltic Sea and one in the Far East.—News item.

Armed Force Reduction

In its third announced reduction in military strength in four years, the Soviet Union has stated her intention of cutting the number of men in her armed forces by 300,000 this year. Previously announced reductions were the release of 640,000 men in 1955, and 1,200,000 in 1956-57. The Soviet Union was estimated to have about four million men under arms prior to the reductions. Of those to be demobilized, 41,000 are to be drawn from the Soviet forces now stationed in East Germany, 17,000 are to be released from troops now stationed in Hungary, and the remainder of those to be discharged are stationed in Soviet territory.—News item.

Missile Training

The Soviets have ordered that the East German and Czechoslovakian Armies be screened for men who have had experience as refrigeration engineers, or who have worked with certain types of volatile fuels in munitions plants or other branches of chemical industries. These specially selected men are to be candidates for special courses in rocketry. The volatile fuels mentioned are those used in missile propulsion. Reports on guided missile bases under construction indicate increased activity in Poland and in the former Sudeten German territory in western Czechoslovakia. A wide arc of rocket bases also is said to be under construction along the Communist-held coast of the Baltic Sea, including the Soviet states of Latvia, Estonia, and Lithuania.—News item.

Budget for Research

The Soviet budget for research in natural science during 1958 will be around 18 billion rubles, 1.7 billion rubles more than was spent for research in 1957. At the official exchange rate of four rubles for one dollar, this is the equivalent of 4.5 billion dollars. Total governmental expenditures for the Soviet Union for 1958 will be eight percent above the 1957 budget, which was 617 billion rubles. The 1958 appropriation for the Soviet Ministry of Defense is 96 billion rubles, slightly less than that of last year.—News item.

ITALY

Missile Plans

Under terms of an agreement with the United States, the Italian armed forces will receive armament and equipment for three Nike antiaircraft battalions and one *Honest John* field artillery battalion. Negotiations for the equipment for five more missile battalions are reported. Other developments include preparations for refitting the cruiser *Garibaldi* with guided missiles, and successful first test flights

of the Italian-built *MR-27* rocket. The surface-to-air *MR-27*, which has an operational altitude of 50,000 to 60,000 feet, is reported to have a speed in excess of Mach 1, and a range of about 20 to 25 miles.—News item.

Air-to-Air Rocket Tested

An experimental air-to-air missile, designated the *C.7*, has been developed and is under test. The *C.7* uses an infrared guidance system.—News item.

NATO

Reorganization Completed

The United States Seventh Army, a major element in the NATO ground defense force in western Europe, has completed its Pentomic reorganization. The Seventh Army's combat divisions are the 11th Airborne, the 3d and 4th Armored Divisions, and the 8th and 10th Infantry Divisions. The 3d Infantry Division, stationed at Fort Benning, Georgia, is scheduled to replace the 10th Infantry Division during the summer of 1958.—News item.

German Forces Received

Two armored divisions have been turned over to NATO forces by the West German Government, bringing the total of German divisions under NATO control to five. The two armored divisions, like the three infantry divisions provided to NATO last year, are at about two-thirds of their authorized strength and capable of only limited combat duty. Two more divisions are expected to be made available to the Atlantic alliance during the summer of 1958. A German navy motor torpedo squadron and an air force transport squadron also have been declared ready for limited duty.—News item.

JAPAN

Air Force Gets 'Sidewinder'

The United States will furnish *Sidewinder* air-to-air missiles for use by the

Japanese Air Force as a step in the implementation of a coordinated defense program for the Far East. Japan's Air Self-Defense Force, as the air arm is called, now has 316 combat aircraft, including 276 *F-86F Sabre Jet* aircraft, and 509 training planes. The arming of aircraft with the potent *Sidewinder* is expected to enhance the air defense capability of Japan's growing airpower considerably.—News item.

Submarine Construction

The keel has been laid for the first submarine to be built in Japanese shipyards since World War II. The new 1,100-ton vessel will be snorkel-equipped and will have four torpedo tubes. Japan's Navy currently has only conventional submarines furnished by the United States.—News item.

NORWAY

Rocket Unit

A mobile Norwegian Army rocket unit is being organized. It will be stationed in the Troms area in the extreme northern section of Norway. The unit will be equipped with United States *Honest John* rockets.—News item.

PANAMA

Army Caribbean School

The most recent class graduated from the United States Army Caribbean School at Fort Gulick, Panama Canal Zone, included 275 officers and enlisted men from 15 Latin American countries. Originally started in 1949 to teach operations and tactics to United States and selected Latin American military personnel, the school has been training only soldiers from Central and South America during the last three years. A total of 7,700 Latin Americans have received training in the school which is staffed with bilingual United States Army personnel and guest instructors from Latin America.—News item.

FOREIGN MILITARY DIGESTS

Nuclear Warfare

Digested by the MILITARY REVIEW from an article by Captain K. E. Gallard
in the "Australian Army Journal" June 1957.

ALMOST without exception, current teaching denotes the use of the tactical nuclear weapon, the largest types, and even the superbomb within a conventional setting. However, conventional situations demand restrictions on numbers of weapons available, limitations on size, and methods of delivery. These restrictions, allied with a superweapon, are inclined to present an unreal picture. No doubt such limitations have a practical application, but the thoughts and ideas expressed and the conclusions reached lean toward an unsatisfactory result, particularly in open discussion.

Perhaps the question to be answered is, "Is there a place for nuclear weapons in conventional warfare?" There will be many to support the affirmative answer to this question and, indeed, produce good affirmative arguments. However, at the outset there is the problem of which side has the initiative and the weapons, plus the power to deliver the weapon at the right time and place. This, in itself, poses another problem within a problem ad infinitum.

At present, we study the phases of war with passing reference to the use of atomic or nuclear weapons in an odd problem or two. This may be dictated by our hopes that we shall fight a conventional war against a conventionally equipped enemy while we hold a small stockpile of nuclear weapons. One must concede that the situation is not without possibility and is catered to in our current defense policy. Still, at this stage, after several years within the atomic age, perhaps our energies and thoughts should be directed further than the conventional.

It is always difficult to divorce one's thinking from conventional warfare, for therein lies experience and practice. Otherwise, why study military history?

Nevertheless, past military campaigns can provide many examples where new weapons completely revolutionized the techniques and practices of the day. This would seem to indicate that perhaps the study and practice of nuclear warfare should be dissociated from conventional warfare to a degree.

A Class Apart?

Maybe one is prone to sidestep the question of total war; either from a natural abhorrence or from the practical viewpoint that such warfare with nuclear weapons is inconceivable in this enlightened age. Then, perhaps nuclear warfare is beyond the average tactical conception and lies entirely within the bounds of grand strategy. These are only observations and not conclusions, but such ideas do tend to segregate nuclear warfare into a class of its own.

Strategic Implications

If one is to believe the incredible result that occurs following the detonation of a hydrogen bomb, surely the employment of such a weapon in war goes beyond the realms of mere tactics. The successful application of such a weapon to a vital center seems to provide defensive problems to which there is no answer. Great dispersion and much deep digging are the best suggestions to date. Such thoughts provide the question, "For what are we preparing?"

In conventional warfare, effort is concentrated to achieve efficiency and economy. Heavy bombing in the conventional sense is accepted as a justifiable risk. If preparations and planning provide for conventional warfare only, undoubtedly there must be a horrible day of reckoning should a changeover to nuclear warfare occur.

It is conceded that there is a basic requirement for wide dispersion against nuclear attack as a passive means of defense. Such wide dispersion would be unacceptable in a conventional war. It is doubtful also if a compromise is possible. A solution has been advocated that there should be a duplication of effort in both spheres, but again it is doubtful whether the peace-time economy of any nation, with the possible exception of the United States, could stand the financial strain. We can only hope to be given sufficient time to

achieve a measure of passive defense should a conventional battle become a nuclear war.

Intelligence

Obviously, to achieve time to prepare intelligence is of paramount importance to have the best information service possible. Strategy always has relied upon good intelligence to formulate a policy in the conduct of war. However, with the new problems created in the field of nuclear warfare the ability to forecast an enemy's intention must be infallible. The earliest possible warning of an intention to utilize nuclear weapons may offer the only means of salvation.

At this stage it is not known just how good is the intelligence system of the Western allies. If there are any doubts, remedial action should be taken now.

It must be assumed that the decision to use nuclear weapons will be a political one, at least from the Western viewpoint. This being so, it would appear that the Soviet Union and her satellites have some advantage. Apart from having considerably less scruples in making such a decision, it may well be that the local political commissar is also the military commander on the spot empowered to make the decision to use nuclear weapons at a moment's notice. No doubt a quick decision must be less liable to interception by Western intelligence.

On the other hand, one can imagine a degree of political procrastination on the part of the Western allies. For example, consent by NATO might well take weeks, and the ensuing deliberations would be most liable to interception by enemy intelligence with consequent loss of surprise. Indeed one must consider that under such circumstances the ultimate result must be to lose the initiative.

The problems associated with the fact that the enemy is in possession of nuclear weapons, and has the means and the intention to use them, must be almost in-

soluble unless a reliable information service can provide an accurate forecast of his intentions. It may be that the conventional war has just been won when the nuclear war is just about to begin.

Concentration

Taking known facts into consideration, it seems that, generally speaking, nuclear warfare does not suit the Soviet bloc. The greatest powers—USSR and China—possess assets that may be nullified completely by nuclear attack. Such major assets are manpower and industrial potential. Both of these assets require concentration to achieve the maximum effect which well could be fatal if subjected to a well-directed nuclear attack.

A logical deduction would be that the West is in a better position because of the ability to disperse various delivery agencies for atomic and other nuclear missiles. A slugging match in terms of nuclear warfare between Russia and the United States perhaps could be carried out better by the latter because the potential sources of nuclear missiles from the United States and her allies literally cover the face of the globe. On the other hand, the target areas of Russia and her satellites are reasonably well-concentrated in the major sense. Russia never could be sure that all possible points of retaliation were covered.

There remains a thought that, given sufficient nuclear weapons to begin and wage a nuclear war, Russia characteristically could remain quite callous to the decimation of her manpower and major cities. She might be prepared to appreciate and accept tremendous losses to achieve a successful result such as the complete destruction of the United States, Great Britain, and their allies.

Decentralization and dispersion will be difficult for Russia and China, as both countries are comparatively new in the lineup of industrial power. Such power was achieved only by intense concentra-

tion in selected areas, and the results of hard work in this direction are just coming to fruition. If the West is said to be hidebound in the conventional sense, it is only natural to assume that the same applies to the Soviet bloc, only more so.

Therefore, it seems that, initially, the Western Alliance, with its greater dispersion of manpower and industry throughout the world, is better placed strategically to survive a total nuclear war.

Economy of Effort

The use of nuclear weapons undoubtedly will result in savings on the battlefield of large numbers of troops and materials. However, what will be the battlefield? In all probability it will encompass the entire world, and no vital center necessarily need be safe from attack.

To achieve a stockpile and adequate production of nuclear weapons one has only to look at the tremendous effort involved at such a place as Oak Ridge, California. This center of nuclear weapon production is an example of concentration to give efficiency. The production center thus concentrated is vulnerable, even if the distribution point of the missile is not.

Consider the cost of production of a nuclear weapon. If one is to believe the written word, the extreme cost is such that production must be limited by financial resources. No doubt the question of economy will be solved. Nevertheless, the nuclear weapon at this particular time does not derive much from the principle of economy of effort. It seems that more manpower, money, and materials are required at the production end to get the desired result.

Interior and Exterior Lines

One can only presume that a nuclear war will be fought on a global basis. Modern methods of weapon delivery, including electronic target-seeking devices, point to the warring nations operating on in-

terior lines, at least during the initial stages. Again, to the uninformed observer, it appears that the Soviet Union and her satellites are at some disadvantage.

The use of satellites to absorb the shock of any land offensive from the West against Russia must be nullified to a degree if a knockout blow can be delivered from a long distance. At a casual glance it seems that a major revision of Soviet defense strategy is required in the light of possible long-range nuclear attack from the West. Perhaps the Soviet problem is even greater than that of the West.

Conclusion

The thought that there will be no nuclear war remains uppermost in most

minds. Therefore, conventional warfare still holds pride of place. However, it would be well to remember that the United States is arming in such a way that warfare on a large scale in the conventional manner may not be possible for this Nation. It must be reasonable to assume that if attacked, the obvious measures available to the United States for retaliation are mainly nuclear in character.

There is no need to go completely overboard and push nuclear warfare to the detriment of conventional techniques. Nevertheless, it is apparent that it is time that a comprehensive bulletin on organization and employment of nuclear weapons is published to clarify some of the doubts in the average mind.

Infantry Today and Tomorrow

Digested by the MILITARY REVIEW from a copyrighted article by General Sir Richard N. Gale in "Revue Militaire Générale" (France) October 1956.

THE simple thing to remember is that an infantryman is an infantryman. Overmechanize him and he becomes a hybrid, something between an armored car and a tank: he is certainly not an infantryman. Once he loses the main characteristics of an infantryman he loses what he cannot afford to lose: his individuality. An infantryman is a soldier who fights on his feet with weapons which he can handle and, as a general rule, carry by himself; for purposes of discipline and cohesion on and off the battlefield he is organized into battalions and companies. He can ford rivers, swim, climb mountains, stand all the rigors of arctic and tropical climates, and he can move through jungle and across deserts. He can be transported by air, by sea, by rail, and by motor vehicle, but he fights on his feet; his real endurance is the length of time he can stay on his feet.

Is there a place for the infantryman in war today? Has the advent of atomic mis-

siles displaced the necessity for good infantrymen? Has mechanization in its most up-to-date form outmoded the man who moves and fights on his feet? In the modern concept of "all-out" war can the man who moves and fights on his feet survive? For what types of war do our various national armies train? To what extent does the "cold war" affect this problem? An attempt to answer these questions must be made before any safe conclusion can be reached.

Some Deductions

The real effects of nuclear warfare on land battle can only be surmised. However, so much has been written in the public press by scientists and others on the general effects of nuclear weapons that some fairly reasonable deductions can be drawn.

This new weapon puts into the hands of the commander possessing it in sufficient quantities, a lethal power never before available. The development and exercise of

this lethal power must and will have the most far-reaching effects. While we cannot necessarily claim that they will be decisive, they certainly will be such that their use will be a major, if not the principal, factor in the entire campaign.

The impact of these weapons on the enemy may well be such that the entire previously conceived tempo of the land battle will undergo a radical change. Counteroffensives, by what we would have previously considered as inadequate forces for the task, may indeed become possible or even essential if the military advantages resulting from the devastating effects of these weapons are to be reaped. Therefore, it follows that the effects of the use of nuclear weapons by the enemy must have an influence on our land strategy as well as on the conduct of the modern land battle. Concentrations of troops, such as occurred in the crossing of the Rhine in March 1945 for instance, would be fatal today.

So much for the wider view. What of the more intimate aspects? The principal characteristic of this weapon is the enormous concentration of lethal power. Mass destruction of human beings has not won tactical victory in the past. In the First World War the Germans used phosgene gas against us in an attempt to drive through to the English Channel. At the time we were completely surprised, our casualties were enormous, and we were totally unprepared.

Let us not forget the devastating casualties the French Army stood up to at that military classic, the Battle of Verdun. On the first day of the Battle of the Somme, 1 July 1916, the British Army suffered 57,000 casualties alone. The French and British Armies fighting together, therefore, have known what it is to stand up to great devastation. Look, too, at the photographs taken in World War I to see the destruction caused by shelling in the great towns and little villages of France.

The sheer fact of mass destruction does not kill the will of people to fight, neither does it do away with the necessity for infantry to confirm the victory.

It was the French infantry that ultimately stopped the German infantry at Verdun; and then it was the German infantryman who checked and slowed down the advance of the British infantry in the Somme. Our tactics may have been, and were, unimaginative, but the fact that our infantry existed as the ultimate means of defense and attack remains unchallenged.

The conclusion I reach is that the results of atomic attack may not be final and conclusive, but they will affect in detail the conduct of battle. Concealment, deception, cover, and sensible dispersion will be necessary. Such measures will go a long way to minimize the effects on ourselves. When used offensively by us, armies must be sufficiently flexible and mobile to take advantage of the opportunities which may be created.

Air Superiority

There is much talk of air superiority which is of the utmost importance; each side will fight for it. However, as a factor it must be viewed in a sound and reasonable perspective. I do not believe that armies without air superiority are lost. Indeed, the whole teaching of the last war showed the reverse to be the case. In the early days in the Western Desert and North Africa we certainly did not have air superiority, but we fought for it and it was not until we gained it that we could really turn to the offensive. The Germans lost air superiority, but it did not prevent their fighting stubbornly on. It was the fact that they could never regain it that told their defeat. The skillful, most economical and worthwhile use of such air resources as one has perhaps will tell more toward success in the battlefield than any other single element.

I believe that severe air inferiority is

one of the aspects of modern battle which might cause unnecessary panic. Therefore, its impact on the infantryman must be understood. He must be trained how to regard it as well as how to react to it. Foolish disregard of it will do much harm. An overdread of its consequences or too much faith in the immediate effects of our air superiority on the enemy must be guarded against.

Deception and its corollary, concealment, are vitally important factors. Both must

action dominates the battlefield on that spot where it stands. A larger number of them merely extend the size of the spot. If the theorist tells you this is not so, disbelieve him. Tank strength is a factor in the conduct of modern battles which you cannot ignore. The correct handling of this potential force should dominate tactical thought. As a corollary, the study of the antidote to it is of considerable importance.

— This brings one to the field of antitank



US Army Photograph

Tanks will continue to be a factor in modern battle. Shown above is a tank destroyer being ferried across the Rhine River to reinforce infantry troops in World War II.

form planks of all plans, and neither should be brought in as afterthoughts. This demands a high standard of training and a high standard of discipline.

Armor

My next remarks concern armored forces. Memory is often short and theory is sometimes sweet. A heavy tank still in

defense. Here there has been great development. The elements of antitank defense are as follows. Ground: high velocity armor-piercing guns, generally carried in tanks; lower velocity weapons firing squash head or similar shell; infantry weapons, very powerful in their effect but very limited in their range; mines, detectable and undetectable; and, looking into

the future, the guided missile. This is a very formidable range of defensive weapons. This array has been claimed by some to be so formidable that, once again in the field of military adventure, the defense has mastered the attack: to those of this school it means the nadir of the tank. I do not belong to this school of thought because I do not believe it is as easy as all that. What I do believe is that a balanced view is necessary.

The Balanced View

There are other elements which help the attacker. The first is local air superiority giving to the attacker the ability to saturate the defense with air attack by rockets, napalm, bombs, machineguns, and high-explosive bombs with proximity fuzes. Second, there is the effectiveness of well-handled artillery fire; and finally, there is the wit and genius of man, his drive, energy, and resourcefulness.

The basis of our organization is the division, either infantry or armored. These divisions fight to defeat the enemy. Their role is to annihilate enemy armies. The method will depend on how the commander intends to fight his battle. He may attack, or he may defend and then counterattack. His principal weapon may be the atomic missile. But to exploit this, divisions will advance, get to grips, and complete the destruction of the enemy.

In defense they will draw the enemy on to their defensive positions, or into gaps between them, and kill by atomic weapons and complete the annihilation by counter-attack. Either in the assault or in the holding of ground, infantry is an essential ingredient. Firepower may kill a number of the enemy; but, as has been pointed out, of itself it will not be conclusive.

The vital assault must be made by men; for, due to the inherent limitations of any form of cross-country vehicle, armored or not, only infantrymen can cross all types

of country and come to personal grips with the enemy. In fact infantry, in spite of all these modern developments, still plays its vital part.

The entire alertness of a front, however wide, ultimately turns on the infantryman. By day or night, in fog, rain, or snow, it is he who stands sentry and guards the front. The front crumbles when infantry crumbles, and holds when infantry holds.

Holding ground makes heavy demands on infantry. As we have seen, important as firepower is, it cannot replace infantry. Indeed, it is infantry that provides the cover from which firepower, even infantry firepower, can be developed. Gaps may be covered by fire, but the fire producing units must be protected by infantry dispositions. Thus to reduce the number of infantry battalions in a division merely reduces the cover which is essential to fire producing units either in, or temporarily added to, the division.

In the case of armored divisions whose role is essentially offensive, infantry is necessary to fight with or for the tanks. Its role is to protect the tanks from the direct, close-range assault of tank killing, short-range weapons. Infantrymen must seize and hold ground essential for the cover of armored maneuver: they must attack those positions and objectives which are unsuitable for armor to attack but which are an essential part of the plan. They must hold ground, which armor cannot do.

Lesser Wars

My remarks so far have dealt with total war probably waged in Europe. There are, however, other wars which are not global wars; sometimes international as in the case of the war in Korea, sometimes national as in the case of Indochina and Malaya. Indeed, scarcely a year has passed since 1945 that has not witnessed fighting on a considerable scale. There seems to be little end to this kind of strife. Certainly few, if any, of these small wars

could have been, or were, foreseen 10 years ago.

In all these conflicts the role of infantry as the *arme blanche* is unchallenged. When infantry has allowed itself to become reorganized for the theoretical atomic war it has become ill-equipped and improperly trained for its traditional role.

My firm belief is that either in the cold or in the hot war, infantry should retain its classic role and should not allow itself to be reorganized on a theoretical conception which ignores both the lessons of the past and the dictates of commonsense.

The Battalion

Infantry fights by battalions, battalions must not be too weak. The strength of infantry rests on the strength of the battalion. There must be sufficient men in the battalion to provide the sentries, double at night; to provide the patrols; and to have sufficient men to ensure that the battalion as a whole does not get tired out by having too many men, for too many nights, doing too much sentry, and too much patrol work.

Undermining the rifle strength of a battalion on the grounds that it possesses automatic weapons, a popular thesis in some quarters, is dangerous and completely ignores the grim realities of fact. This same consideration bears on the value of and extent to which a battalion can afford frills. Signal communications are grand, but a lot of signalers sending messages to companies that are too weak to do their job is but cold comfort. Transport is essential, but a lot of drivers sitting in motor pools while a grim fight in the front is in progress is a waste of manpower. Carriers and mortars are excellent; but if they are there without sufficient men in the rifle companies they will look silly. The tendency to add new weapons to the

battalion, and to build up big, efficient support and headquarter companies must be watched. This infringes too much on the backbone of the battalion—the rifle company—for whose assistance really they only exist.

Therefore, in considering organization and establishments we must work back from the section. This must be of a minimum strength to ensure that it can carry out its function, even after casualties: that it can provide the sentries, hold its front, and cover by fire the gaps between the sections of the platoon and between the platoons themselves. These latter tasks are properly the tasks of the light machineguns: the frontal defense of the section post is the task of the riflemen. There must be sufficient men and they must be capable of using and confident in their rifles.

Next, we work from the four rifle companies. In the same way these must be capable of carrying out their role, either in attack or in defense. It is the tired-out, depleted rifle companies that spell the tired battalion. The medium machineguns will cover the gaps between the rifle companies and the larger gaps between the battalions. They can fire on fixed lines and must be able to fire accurately by day or night, or in fog or smoke.

Once the rifle companies are right, we can give to the battalion the top dressing of the rest of the support company and headquarter company. We must not make this unit too big, too unwieldy, and too complicated for one lieutenant colonel to command and train.

Good infantrymen are as essential today as before. They must be optimistic and have faith in themselves. They must be physically fit, for the infantry soldier has got to be a robust man. If he is not, he cannot do what is required of him.

The Modern Strategic Concept

Translated and digested by the MILITARY REVIEW from an article by General Paolo Supino in "Rivista Militare" (Italy) July-August 1956.

CONCEPTS which possess the value of a composite of vast systems of ideas and activities should be brought up to date as soon as any substantial disparities are noted between their current applicability and the general content of the ideas and activities whose composite they constitute.

Among the concepts which must be kept current is that of strategy. Our first problem, then, is to arrive at a sufficiently exact definition of strategy to include its meaning, missions, and attributes. The rational method for redefining a given order of ideas or facts in accordance with a changing view consists, as a rule, in starting with the concept of the ideas heretofore entertained, and in analyzing the motives which have suggested the adoption of a new concept.

Above all, traditional strategy is a military strategy. The qualifying word "military" was not necessary 100, or even 50, years ago, at a time when thinking men were satisfied—as many are today—with the well-known proposition of Clausewitz:

"Tactics is the doctrine of the employment of combat forces in battle; strategy the doctrine of the employment of battles for the objectives of war."

In support of this, General Foch asserts that "... no strategy can be superior to that which aims at ensuring tactical results—victory by means of the battle."

Tactics, in this sense, is sovereign and strategy is at its service, with the principal aim that of determining the circumstances for the imposition of the tactical act and, afterward, for the most complete exploitation of the tactical success.

All this is not lacking in logical coherence, and possesses the prestige of precedent so long as the experience in question concerns the Napoleonic campaigns and

the wars of independence and national unification of the 19th century. But to maintain its authority it must successfully find confirmation by constant agreement with more recent experience.

One immediately critical point—because concrete facts give substance to it—is presented by the changes which have taken place in the physiognomy of battles, and in the functions attributed to battles in modern war. The former has changed profoundly, and the latter, synthesized, reveals a reduced influence of tactics on the general economy of war.

As expressed in the above terms, the two points may be adjudged paradoxical. In fact, however, they are strictly in conformity with experience and, what is more important, their discussion permits a review of the principal points which arise by general progress in military matters.

The Phenomenon of War

Modern strategy is a complex phenomenon made up of numerous, separate branches, although presided over by a unified concept of acts and objectives called "political strategy."

Between strategy and political strategy stretches the road that has been traveled in more recent times—for political strategy is the strategy that has been derived from the lessons of two World Wars.

These lessons have not yet been entirely assimilated, notwithstanding the fact that they reveal, in the most persuasive terms, the importance and power of destruction of modern armament, culminating in the explosion of the two atom bombs which brought an end to the war in the Far East. But mental obstacles to immediate deductions, arising either from fear of incautious prevision or the dislike for the aban-

donment of deep-rooted systems of ideas, still exist.

Today, wars are conducted by coalitions which comprise the most powerful states on earth, spread over vast, three-dimensional spaces covering continents and oceans, and last for a length of time commensurate with the gigantic forces involved.

The advocates of so-called rapid warfare and its subtype, blitz warfare, have found apparent comfort in looking ahead at the employment of the nuclear explosive in the tactical and strategic field. These foresee the hostilities of an eventual new world war limited to the passage of a few hours or a few days—all that is necessary for the dropping of a certain number of nuclear charges on the enemy's territory, reducing it to a desert waste.

Rapid warfare, capable of bringing about the surrender of the enemy within the limits of the brief time indicated, is a dangerous Utopia. It easily causes conventional arms and methods to lose their value and, when it fails, its incautious advocates find themselves faced with situations which, in general, turn out disastrously.

An accurate analysis of the premises and consequences of a third world war logically can give rise to a train of thought that is very different and merits examination of its principal elements.

Future War

The memory of the efforts, the sorrows, and the fighting of the World Wars are still vivid, and are rendered still more acute by the realization that a third world war will bring them back again in a considerably magnified form. To the certainty of the extreme gravity of a third world war is joined the conviction of its extreme inanity for the victor himself who would be burdened with inevitable and formidable economic burdens both during and after it.

A salutary fear is developed, therefore,

of tempting the fates. From this are born two different attitudes. First, that no intelligent individual would lightly assume the responsibility for acts which would plunge populations into the depths of the abyss. The other is that, without renouncing their fundamental objectives, all persons are inclined toward actions of such a nature as to prevent crises and are adaptable, in their execution, to changing situations. If the one attitude may be said to constitute a deterrent to men of power, the other may be said to operate in the direction of the removal of the threat of a new war. The two favor the adoption of a "modus vivendi" that will render tragic epilogues improbable.

At the same time, other factors of a more specific technical character exist in the domain of military operations. They cooperate with the preceding, and contribute to radical changes in the staging and development of the events of war. The adoption of new weapons and other means provided by the development of modern technology has extended the field as well as increased the effectiveness of the operations of war, and has complicated its planning and conduct.

The theaters of operation of today include vast continental and oceanic areas. The masses of men and machines in action are enormous. Operational phases are, as a rule, of considerable duration. The enormous masses in action and the considerable duration of the operations raise the consumptions of war to such a magnitude as to tax severely the most formidable industrial complexes of the world.

Relative capacity of production is largely decisive in the matter of success. As a result, the battle has lost the character of an episode restricted to narrow limits of time and space, and has assumed that of an organized front in movement during the course of an entire operational phase. It no longer possesses

the importance of being the sole decisive act.

While the complex sequence of tactical episodes is taking place in an apparently chaotic manner in distant localities, and, as a result, keeping intermediate situations fluid and uncertain, the results of other events which develop far from the field of battle also are maturing. However, they are no less important and no less productive of important successes—the events of the interior front.

The Interior Front

This term, casually born in World War I, acquires a more intensive meaning in the light of the above considerations. Because it is necessary to overcome the competition of the interior fronts as a preliminary to winning frontline battles, the idea that one can obtain decisive results by operating solely against the interior fronts has gained headway. Once this concept has been recognized as well-founded, the deduction follows that action on the interior fronts might be the most advantageous course and one might even omit the constitution of active war fronts and depend on the results of a very efficacious substitute.

All this is antitraditional, par excellence, but is in accord with the undeniable logic of facts. Incontestable reality, even though of recent origin and still more recent recognition, has led to the concept of wars won preferentially by reliance on nonmilitary matters, which brings about a very definite diminution in the incidence of the military aspect.

The repercussions of this line of reasoning do not stop at this point. The gradual shift of interest from matters of a military nature to matters of a nonmilitary nature in the attainment of the objectives of military action have led to the recognition of the fact that, in many cases, the attainment of the majority of the objectives has proved easier and less

costly. Hence, it may be substituted for declared hostilities.

To admit that the objectives of a war may be achieved in spite of the continuation of formally peaceful relations, is equivalent to imparting validity to the renouncing of recourse to arms without renouncing the greater results attainable by that means.

Military Potential

The shifting of interest from exclusively military to paramilitary and extramilitary matters has brought the military potential of nations to a prominence that would not otherwise be justified.

That military potential is capable of exercising a concrete function even before it is manifested in an effective manner, is a matter that has been proved by experience and, therefore, can be accepted without argument.

Moreover, one of the reasons for peacetime armament has always been to create a condition of risk for anyone who contemplates attacking his armed neighbor. This potential action has been, in all eras, a contribution by military preparedness to the preservation of peace. A new fact is constituted by the extension and perfection of the preventive action no longer confined only to concrete military preparedness but also to the general organization of the states.

The concept of military potential—a concept of recent origin because it has existed little more than 30 years—implies the existence and the efficacy of certain factors. The concrete value of these factors as strategic or tactical determinants one may argue at will, but there can be no doubt of their capacity for acting in the preliminary phase of any direct action. Neither can the possibility be excluded that even in this case their action may have decisive results.

By the employment of suitable means, military potential can be inventoried and a correct evaluation obtained even though

the operations required are of such complexity as to require electronic machines of the National Bureau of Standards' Eastern Automatic Computer (SEAC) type. This has given rise to that spurious form of warfare designated as "electronic-brain warfare." This consists of an enumeration of the large and smaller units of the potential adversary's armed forces along with their distribution and evaluation. It also appraises his economic situation and industrial organizations, the indication of his spiritual solidity, and permanent or contingent data of a political, geographic-military, scientific, technological nature, and so forth.

Predictions

The most striking aspect of electronic-brain warfare is that the total appraisal of the military, paramilitary, and extra-military factors, when carefully effected, permits a well-based prediction of the probable outcome of an armed conflict. It is logical that when the results obtained point to substantial risks or, worse still, to a definitely unfavorable outcome, recourse to armed conflict is not advisable.

Under these circumstances the party, whose factors of power are least, is obliged passively to witness the development of events that would have been the result of a lost war under other situations. Conversely, the party who profits by the dominant military potential finds no obstacles in the way of the attainment of his objectives.

The dominant party will have won the war without combat and that of lesser strength will have lost the war before beginning to fight.

Factors of Power

The foregoing considerations lead us to attribute an importance far greater than has been recognized in the recent past to the preconstitution and consolidation of the factors of power of state. In the field of doctrine, they call for a pro-

found modification of fundamental ideas, a modification whose necessity is confirmed by experience. It logically indicates the need for a decisive change not only in military technique but also in the basic processes by means of which the international policies of the states are put in operation.

Certain potential factors are destined to assume an even more decisive place in the substratum of international relations. These factors vary from acts of organization of military forces to the organization of complex systems of forces effected through alliances and federative forms; from commercial agreements between like industries to the working out of a joint production effort by coalitions of states as the result of an emergency situation. They have revealed themselves with great distinctness as soon as wars have totally involved the activities and faculties of the nations concerned.

Still more surprising is the fact that one fundamental offspring of the new order of things—success in nonconventional and surreptitious forms of war, of which the cold war is the most widely known representative—has not been given the thought it should have.

Judged on the basis of the above considerations, cold war is not the invention of political personalities in search of Machiavellisms. It is simply the logical result of very complex situations which cannot be advantageously settled by recourse to arms.

Operational Technique

The effort toward finding an effective equilibrium in relationships, imposed by a new and unforeseen reality, has been handled more by civil research groups than by military technicians.

These contributed to drawing a veil over intelligence and an erroneous evaluation of the evolutions in progress with respect to matters and institutions of a military nature. As a result of this, in the course

of time and in a peremptory and unavoidable manner, war now involves the entire population and resources of a state *since it has assumed the character of a conflict between peoples in place of a clash between armies.*

Therefore, there was felt the need of joining to the strategy of an exclusively military contest, a new order of concepts, concepts which include a resolution of the paramilitary and extramilitary problems created by war—a need which presented itself with the imperiousness stemming from the importance of the problem at hand.

The concept of a strategy whose purpose is to guide armed forces both before and after the battle is now too restrictive and, therefore, not acceptable in the light of the experiences of the two World Wars.

In its stead there is developing a new field of science which comprises, in an organic system, all the concepts, factual data, synthesis, and even the intuitions which are necessary for the initial drafting and conduct of major undertakings. This considers a series of phases of action extending from the conception of the projected operation and the foregoing determination of actual possibilities, to the execution of the operation by overcoming probable difficulties.

That this is still called strategy is a mere matter of convention. Its sole value is that it joins the new concepts to a tradition of thought with special emphasis on the more apparent role of the military means directly or indirectly employed. The field within which it operates, however, is far more extended than that of traditional strategy.

A Modern Strategic Concept

An up-to-date strategic concept, if it is to be adequate for and in agreement with the frameworks of present-day actions, must spring from a considerable mass of factual data. This must be systematically

elaborated and capable, by means of the proper synthetical procedures, of permitting deductions solidly anchored to the elements actually involved in each concrete case.

The elaborations mentioned above are not yet ideas that are precisely in accord with fact, but in strategy, as in many other fields in which ideas and facts operate together in a close and reciprocal manner, *it is the ideas which guide the facts, and this guidance is truly effective when it is accurate generalizations of the facts that have suggested the ideas.*

Far from being a mere play on words, the foregoing proposition is capable of bringing out the mutual bonds of cause and effect which constitute the foundation of all good concepts. At the same time it evolves the merit of practical orientations and the necessity of constant adherence to the concrete in the planning and execution of the acts to which reference is had.

For the reason that the strategic concept is always based on considerable factual data, there exists the intrinsic necessity that data, presuppositions, and aims be presented and seen with extreme clarity.

Clarity of presentation and vision, coupled with exhaustive elaboration and deduction, is rendered still more indispensable because the functions of modern strategy are extended far beyond the duration of armed conflicts.

An exclusively military strategy reduces to absurdity when the direct employment of military means is excluded. In spite of this, the missions of strategy are not diminished; they are only shifted to problems which are not necessarily military and which are outside the specific competence of military personalities.

The concrete opportunity to exercise strategic activities outside of specifically war situations confirms a functionality which is broader than that exclusively re-

quired for the employment of armed forces.

Hence, strategy is the guide of the complex acts which unite and utilize the resources of a state—and the armed forces are one of these resources, among many others—for the purpose of safeguarding its interests against any menace whatever, be it actual, potential, or presumed.

The Political Proposition

A strategy characterized by such requirements has more the aspect of a political proposition than military technique. Its experts no longer need to be military personalities—in truth, the chiefs who are charged with the task of making decisions and directing dispositions, of necessity, are not military personalities.

Strategy has acquired close connections with political incumbencies, diplomatic activities, acts of high administration, and with the organizations of the economy and industry of a country. In short, strategy is so aligned with the spirit of the historical development of a people and their particular concept of social life, that it can no longer be entrusted to a limited

circle of military specialists. The military element, even at its highest levels, does not assume missions stemming from the domain of political strategy. It merely retains its functions of eventual collaborator in time of peace, and as an exclusive agent for the purpose of hostilities.

It is natural then that the question be asked: who are the men who conceive and put into effect the decisions concerning the matter under consideration and on which so great a part of their current life and the future course of their people depends?

The reply is not difficult. In ordinary times it is the men of the government, aided by an enlightened public opinion to include the intellectual, organizational, and production elite of the country.

In time of crisis, it is the personalities of exceptional understanding who take over the civil and military powers. The wisdom of patriotic institutions places them in positions of authority and makes them the interpreters of the vital requirements of the collectivity and conscious of a nation in its hours of trial.

Military Tradition and Its Meaning Today

Translated and digested by the MILITARY REVIEW from an article by
Wolf Graf von Baudissin in "Wehrkunde" (Germany) September 1956.

IN TIMES of profound change it is only natural that man should be concerned with present realities. The feeling for historically constrained evolution and the desire for the maintenance of the *status quo* tempers this, however. The result is that our attitude, linking the present with history and tradition, acquires traits that easily may prove false and dangerous. Some retreat into the past from the duties of the present under the banner of "tradition." Others evade the demands of tradition by seeking to escape into the world of

today or even into an unpredictable future.

It seems obvious, however, that those who look back as well as forward are the best able to deal with new tasks. Half-truths are brought into being by obstinate traditionalism as well as by a hostility against historical tradition, seeking renewal for the sake of renewal.

Tradition

Literally, tradition is something that is handed down, accepted, cared for, and

passed on. It seems to be a clear concept, but our conceptions suffer when we add different values to it. Some proclaim tradition to be the last safe pillar in a degenerate world and, as such, is sacred, while others ridicule it or present it as a barrier between us and a better future.

Two sources, quite different in nature, are intermingled in the concept of tradition. One is our heritage in values and basic experiences, the other includes all the customs, rules, ways of behavior, and manners that often came into existence accidentally.

Let us make a difference between permanent moral values and valid basic experiences, called convention. Tradition and convention are both necessary elements of human, and particularly of military, companionship. However, they are related to each other as content is related to appearance.

Tradition creates a common basis for the feeling of life, for values, and standards. It stabilizes the part and gives reliability to the whole. A tradition that is alive saves the following generation from having to start all over again to work at the solution of certain problems. One look at the continuity of several thousand years of occidental science indicates that we would not have radar, nuclear reactors, or jet planes without it. The same goes for moral values.

Stagnant and moving forces always have fought each other. There is no historical life without tradition, but only a tradition that is capable of change has a chance of survival. Where it stiffens and dies it is contrary to living development and escapes the future. A living development is an attitude that always accepts new challenges and that gains, through this, enough power for new development.

Conventions

Conventions on the other hand make daily life easy, reduce friction, and save energy for essential activities. The right

convention expresses the general feeling of the prevailing tradition and is, therefore, of educational value.

Forces that might lead to a new and valuable tradition often are obstructed by the adherence to conventions that have lost their meaning to many people and have been laid aside by others. Such an attitude is hazardous and may have grave consequences.

And yet, people often have fought bitterly in the name of "tradition" for or against questions that might touch us as ridiculous today.

Ruchel opposed the diminution of the number of horses in order to cut down on the infantry service train with the argument that the Prussian nobleman does not walk. In the first decade of this century the Socialist Party's request for favorable consideration of the field gray uniform was refused with a reference to tradition.

Discussion of the new German uniform shows how lack in historical knowledge of facts is likely to be covered up with the screen of tradition. On the one hand there is loud talk about the clear line of development of the German uniform, on the other the "American" dress uniform is mentioned.

As a matter of fact there was no common German uniform up to the time of the *Reichswehr*. Before that, the soldiers of different German countries showed as much difference in uniforms as with some foreign countries. The common similarity in style often led (particularly in coalition wars) to the use of additional insignia for a better recognition between friend and enemy.

For example, the Brandenburgers and the Swedes at Warsaw in 1656 wore straw wisps on their hats. The Prussians at Stralsund in 1715 had two red hearts on their hats, and the allies of 1813 and 1864 wore a white bandage on their left arm above the elbow.

The fact that the Army of East Ger-

many continues to wear the uniforms of pre-1945 reveals their planned mental inclinations. It is, at the same time, a proof of the different path West Germany is now taking. It is easy to understand that the search of the soldier for a new position in the society of a changed and new world also is expressed in his appearance, especially if the relations between form and appearance have been recognized.

More serious than the divergent views about the decorative side, including swords, manual exercise, and forms of parade, is the resistance to new technical developments and new arms. Often enough the most severe demands of warfare were neglected and sacrificed because of considerations of rank or feudal prejudices.

Generally, it can be said that most conventions have had no connection with war and battle. They were left at home when the mobilization orders arrived. This is an alarming sign. The tradition and conventions of the soldier should come from the battle, from a specified situation, and from the task of the soldier. Only then do they have a meaning that is recognized by both the soldier and civilian.

So long as military tradition and convention remain restricted to a special military sphere and are determined by it, no difference between it and the civilian sphere of life and conventions will become apparent. They will, on the contrary, remain a homogeneous part of the whole—they will not compete, but complete.

Military Tradition

Peace is looked upon as a normal state by the European, and therefore by the German, soldier. It is the only objective that could justify war. Peace alone determines the tasks and the limits of warfare. Clausewitz wrote:

The purpose of strategy is originally the restoration of peace. It uses victory and tactical success, and the means that serve this purpose accomplish its objective.

The objective of the restoration of peace requires special consideration of the kind of warfare used and the attitude of the opponent. As Von Moltke said: "Even the victorious war is a national calamity."

One agrees that warfare without regulations based upon moral laws is nothing but blind rage and devastation. It makes the soldier useless for peacetime, and creates the atmosphere leading to another war.

It is true that growing mechanization reduces the areas where the demands of humanity and honor with regard to the treatment of the weak may still be fulfilled. The tremendous potentialities of mass destruction of modern weapons enforce a better training in their justified employment; that is, in a pertinent and moderate manner.

Obedience

The inner force of the soldier depends upon his will to accept the still-frequent chances for honorable behavior or actions that lead to a future peace. If we deny this, then we must give way to those who maintain that only the functionary of death is required today, and we must say goodbye to the traditional soldier. If the humane attitude is restricted only to certain groups it will be lost altogether. The soldier who does not recognize that his enemy is also a fellow man is unbearable as superior, comrade, or fellow citizen. Zones of inhumanity among us must not be created to meet a menacing inhumanity from outside. A soldier without inherent morals is neither qualified nor entitled to protect dignity and rights of humanity.

Another part of military tradition is fidelity to the superior. In the close and personal relationship which must exist, the soldier receives dignity and authority from his superior and identifies himself with him, even if this loyal feeling is expressed in different ways in the structure of society.

On the other side, we find soldiers with conscientious objections whose obedience recognizes religious and moral limits.

Von Moltke, in a discussion, in 1866 demanded: "Obedience is a principle, but man stands higher than principles." Thus he replaced the aristocratic concept of honor of the officer with the religious duty of conscience and the moral responsibility of self-determination. It is the necessary counterpart to the self-abnegation of complete obedience that ordinarily is demanded.

Of course, it is said, the soldier may be forced to obey for several reasons. Most fitting to his service relations is the attitude caused by fear of punishment. Some leaders have maintained that the elements that might particularly influence the honorable passions of the human heart demand a certain culture which is not present among the class that serves in the military profession.

This is one side of Prussian military tradition. But there is another side directly opposed to it. Its most important representatives are Scharnhorst and Gneisenau. Particular in the present hour of German military history they are of direct and lively interest. Scharnhorst wrote:

We have started to value military art higher than military virtues. This attitude brought doom to all countries at all times. Gallantry, spirit of sacrifice and constancy are the main pillars of independence of a people. The moment we forget them we are lost.

Gneisenau writes as follows:

Everything has been done in order to train men in matters of money and the use of the machinery of the state. Much less was done to teach him how to be noble, free, and independent, as a man that feels consciously that he is part of the whole, as a man that has dignity himself. The mere servant usually doesn't care who

his master is and whose property he takes care of.

The close personal relationship with the superior and the will to be identified with him and his interests was characteristic of both attitudes. They were opposed, however, in their ways of behavior in conflict. One side sacrificed moral doubts in order and duty, and the others came to the conclusion that it was in the real interest of the superior if they did not obey orders but only higher laws. One side clings more to the old ways the faster and the deeper the world changes, whereas others sacrifice conventions if they stand in the way of progress of tradition.

The Pillar of Tradition

The clear relationship with the superior is, therefore, one of the main pillars of German military tradition. The soldier who lives only for the service's sake is only a soldier for the sake of being a soldier, and the ways of tradition are abandoned. Thus well-meaning soldiers (as well as some officials) thought they could live for an abstract myth of state and country between 1918 and 1933, and remain coldly remote to the government and its representatives.

There is also the danger of mistaken faithfulness to the former superior. This closes the way toward any solution of the new mission and leads to a political as well as professional hiding. Only those are capable of training and leading whose responsibility is founded upon morals. This is one of the basic experiences of military life.

Without the courage of the superior to delegate responsibility and the willingness of the inferior to assume it, modern forces will suffocate in paralyzing bureaucracy. They become useless for war as well as peace. Without moral standards, that is, without respect for the other person as an individual, training is just breaking in, and educating becomes violation.

Conclusion

Only if we clearly separate the permanent contents of our moral and spiritual heritage from the appearances they may depend on at the time, can we grasp the meaning of the word "tradition." If we hold on to the appearance that is "convention," we are in danger of losing that which is essential.

There is more than one tradition. In history, different attitudes always have opposed each other, a fact that sometimes leads to different demands in practical life. Tradition, therefore, is not a principle leading to conformed thought and action. "Restorationists" and "reformists" always have fought each other. This fight is an important part of history.

It is impossible to claim tradition for oneself and to deny it to others. It makes no difference if other communities only care for the conventional part of it. A moral and spiritual inheritance may only be carried on by the proper heirs. It depends upon their attitude whether this inheritance seems worthwhile to the following generation.

German military tradition is a tradition of service and not of command. It

does not justify pride and arrogance. On the contrary, it demands more of those who live by its standards. The meaning of chivalry is not only a special distinction and characteristic of a knight, today it is also a means of evaluation. We understand it as willingness to serve, consciousness of personal responsibility, and preparedness to render assistance.

If the eye is fixed upon the ideals of the past and upon different social orders, then there will be no room for reality and mission. The soldier is led into opposition against his superior. Isolated tradition is good only for the museum and soon will be satisfied with arrogance and formalities.

The attack of dialectic materialism is directed consciously against the foundations of our tradition as the main pillars of our free society. But this menace gives us, at the same time, a chance for reflection, recognition of ourselves, and decision.

If we want to continue our existence we have to make humanity, the desire for peace, service for the government based upon moral convictions, and willingness to assume responsibility the leading principles of our life. Our power is based upon them.

The Helicopter in the Army

Translated and digested by the MILITARY REVIEW from a copyrighted article by Erich Hampe in "Wehrwissenschaftliche Rundschau" (Germany) February 1957.

THE helicopter is a special type of flying apparatus, and an evaluation of its capabilities and employment cannot be made by a simple comparison with airplanes. It can be achieved only from a knowledge of its special peculiarities. It also would be a mistake, as often happens, to look on the helicopter as a jack-of-all-trades, although its seemingly limitless flexibility appears to lead to this characterization.

Actually, the helicopter as a means of conveyance does take in certain domains which, as a matter of fact, can be covered in no other way. It is in these domains that its peculiar missions lie.

In speed and radius of action the helicopter presently is not the equal of the airplane and, presumably never will be. On the other hand, the regular plane is not capable of vertical takeoffs and landings. The zone from zero to 150 yards in

height is dangerous for the airplane, but is to be regarded as favorable for the helicopter. It is able to take full advantage of terrain rises and forest passages for concealment, and there is no terrain obstacle it cannot easily surmount. With a skid landing gear it is able to land on flat roofs, snow or ice-covered surfaces, and, if provided with floats, can use any kind of landing field, and almost any body of water. It is able to transport loads of every kind, even of a bulky nature, which planes cannot carry.

Finally, it is able to carry out, with precision, subtle missions from the air that would be difficult from the ground and which are beyond the capabilities of other flying devices. The helicopter is a link in the transportation chain that begins where the capabilities of the truck terminate, and ends where the airplane attains superiority with its greater speed and radius of action.

German Prehistory

In the 15th century Leonardo da Vinci drew a number of sketches of helicopter type aircraft. Technicians of the various nations carried the idea forward through the centuries but did not find a practical solution until 20 years ago, when the German professor, Henrich Focke, developed his first helicopter. Essentially, his design fulfilled all the requirements for a flying machine of this type. While this was but a small model, in 1939 he brought out a much larger helicopter, the *Fa-223*, which had a maximum speed of 110 miles an hour and was able to pick up a load of 2½ tons. About the same time, the German inventor, Anton Flettner, built a naval helicopter, the *Fl-282*, for the special mission of submarine defense.

In 1942-43, German submarines used a motorless *Wagtail* autogiro for observation, towing it by means of a cable which also contained telephone wires. This small autogiro could be disassembled, packed in

two watertight tubes, and stowed in the bridge superstructure.

The helicopters allotted to the German Wehrmacht gave excellent service during World War II, mainly in the framework of the Air Transport Service's Emergency Branch, and also were used in rescue missions.

However, it was not until the end of the war that the importance of the helicopter for military purposes was more clearly recognized. In September 1944 the Mittenwald Mountain Infantry School carried out a series of successful tests with helicopters for carrying loads in mountainous terrain. It was found that loads could be carried into almost inaccessible areas in minutes by this means, whereas ground transportation took hours to accomplish a similar task. Two well-functioning helicopters take the place of an entire pack battalion of 500 men with a large number of pack animals, according to these tests.

Together with this, the possibility of instituting new and unexpected points of attack through the transport of cannon and ammunition by helicopters was presented. For the first time, the helicopter's significance as a direct tactical combat means became apparent. But it was not until the end of the war was approaching and the Alpine region was being considered as the last bulwark that mass production of helicopters was undertaken. It was too late, but the high military value of the helicopter definitely was established.

Korea

In the Korean campaign the helicopter provided further proof of its military significance. It was employed on missions for which it was not originally intended, and it handled them successfully. A comprehensive increase in the number of helicopters in the American Army began. One can appreciate the degree to which the helicopter proved its worth on the basis of the two missions for which it was em-

played mainly—for command and liaison, and as an instrument for various troop missions.

The helicopter had become for the higher command staffs—from the division upward—a flying jeep. These commanders could find their units and discuss the situation with them on the basis of their own impressions within a very short time, without delay, and over any obstacles. No unit leader was sure that the roar of the whirling rotor blades would not suddenly be heard behind his combat post and the high commander would be unexpectedly standing before him. These "surprise effects" appear to have been limited to the friendly units which, with the dispersed form of combat, in itself, may have been a great advantage. The helicopter does not appear to have been used for tactical surprise at that time.

The helicopter served in signal communication units, in engineer units, and in the medical service. Every signal communication battalion was supplied organically with a helicopter and used it successfully for the laying of field wire lines, especially over impassable terrain. It was necessary to mark the cable and telephone lines plainly to keep them from constituting obstacles to the low-flying helicopters.

The engineer construction battalions—about the equivalent of the German heavy engineer battalions—had two organic helicopters per battalion and were able to make good use of them in terrain reconnaissance and bridge construction. Determination of the position of lines and the emplacement of bridging equipment can be more rapidly judged and directed from above than from the ground or water. Here again the helicopter increased efficiency from the standpoint of speed and accuracy.

The greatest use of the helicopter appears, however, to be in the transportation of wounded. In this field, astonishing feats were accomplished. About 18,000

wounded were transported from Korean battlefields by means of the helicopter. Most of the cases were injuries such as head and abdominal wounds that had to be dealt with quickly and which could not endure transportation by land. It is stated that the transportation of such wounded, from the time of the injury to the medical center, normally did not exceed 30 minutes. As a result the lives of many wounded men were saved. This fact was reported as of great morale value to the troops. These experiences have been given special consideration in the reconstitution of medical units in the American Army.

Frequently, it is asserted that the helicopter is very vulnerable to enemy ground fire in the combat area. Surprisingly, this view is in no way supported by the experiences in Korea. One supposedly authentic source indicates that not a single helicopter was lost in the air by enemy action. The maneuverability of the helicopter also makes it a very difficult target for interceptor aircraft.

The best proof of the helicopter's successful military employment in Korea is to be seen in the fact that the number of helicopters in the American Armed Forces has been increased considerably. The present number in the Army has been given by the press as several thousand.

Further Development

Technical efficiency increases to the extent that special technical means are developed for each separate task. It is not surprising that a large number of different types of helicopters have been developed, each of which has been created with the view to best meeting certain requirements.

However, military employment can be given only to a limited number of these special types. Too great a variety increases the difficulty of handling the helicopter, decreases its operational efficacy, and multiplies the problem of replacement parts.

It would appear, therefore, as in the case of motor vehicles, that only three main types are required. These are the small three- to four-place helicopter, corresponding to the passenger automobile; the medium helicopter, corresponding to the light truck; and the large helicopter of more than 20 places which could be compared to a bus or cargo truck. Within these groups, there should be no diversity of models. This will prevent such difficulties as occurred with respect to motor vehicles during the Second World War. In the case of the helicopter, limitation of types is still more important since the efficient operation of the helicopter is even more dependent on a steady flow of replacement parts than is the motor vehicle.

Moreover, these three types should meet all military requirements. By far the greatest variety of employments would fall to the small helicopter. This type ought to be especially dependable in the field where technical showpieces are not needed as much as reliability under all circumstances in the fulfillment of assigned missions. Such dependability is, above all, the result of the exploitation of years of experience. This should be considered when innovations, seductive as they may be, are suggested.

The other two large classes are not to be considered as normal troop equipment, but as special transport means for troops or supplies. That helicopters for up to 400 passengers are being planned is an indication of the magnitude to which developments are leading. It should be mentioned, however, that every increase in size means greater difficulties to be overcome, hence any development in this direction must proceed a step at a time.

Command and Communication

The conduct of combat operations—no longer in a combat line but in separated combat groups—as well as the necessary wide dispersion of the units in the employment of atomic weapons and guided

missiles, requires that the higher troop commander leave his place in the armored car and take to the air. It is only thus that the commander can directly ascertain the combat situation and influence the troops by his presence at the points of greatest danger. Telephone lines and radio do not satisfy this need.

In addition, by the installation of television cameras in the command machine, the higher commander would be able to obtain a direct optical picture of the situation in certain objective sectors while he was still on the ground. The "field marshal's hill" is thereby not only replaced by other means, but is freed from enemy action. This possibility also offers invaluable advantages to the higher artillery commander.

The use of the helicopter is equally advantageous to the staff members for supervision of march columns and to transmit to the units the necessary orders by means of radio or loudspeaker. They can be used to search for rest and bivouac areas which provide the necessary cover and camouflage. The units can be led to these areas by flying ahead of them or by giving directions from the air when there is a scarcity of time.

The condition of highways, roads, and terrain can be reconnoitered in the same way. Trafficability of highways can be determined and traffic bottlenecks detected. Assembly and stream crossing areas can be sought out. If necessary, the helicopter can take over the security of the unit in such an assembly because it is able to catch sight of any possible enemy movements in the surrounding area.

It will be particularly valuable for moving liaison officers over terrain that is no longer passable; for example, terrain which has been torn up so badly or radioactively contaminated by atomic explosions that the ordinary personal car can no longer pass over it. Radio communication is possible, it is true, but only an emer-

agency means as compared with direct conversation.

For atomic, biological, and chemical warfare troops the employment of the helicopter offers the following possibilities: If the probability exists that the terrain is contaminated by the use of war chemicals, samples of it for subsequent determination can be taken quickly without risk to personnel. The same is true when contamination by the scattering of radioactive substances is suspected, or after an atomic explosion. By means of radiation-measuring devices this may quickly, definitely, and safely be ascertained—a dangerous and time-consuming task for which special details would otherwise have to be assigned.

At the same time, the helicopter could warn any troops who chanced to be approaching the area and also mark off the contaminated terrain with warning signs. It will prove an advantageous means of removing detachments from a dangerous zone such as this, since the longer the time spent in contaminated terrain, the greater the danger to the individual. Finally, the helicopter will show itself to be a practical, indeed a well-suited, means for spraying decontaminating substances on terrain areas such as narrow passes and bridges which must be traversed. The helicopter literally could be designated as a jack-of-all-trades for these specific missions.

For the artillery, the helicopter is a well-suited means for close terrain reconnaissance in search of suitable and covered firing positions, and for the rapid transfer forward and the stationing of advanced observers in suitable locations. Its value for fire direction in larger units already has been mentioned. Thus the helicopter takes the place of the obsolete captive balloon. Equipped with radio or a television camera, and, if need be, remotely controlled, the helicopter will be an excellent means of observation. During the necessary regroupments for the formation

of new strong points, the helicopter is a liaison, reconnaissance, and command means at the same time.

It is hard to say whether wire signal communication lines will play the same role in the future as they did in Korea or whether they will be replaced by radio. But even if they are, the possibility of a rapid landing of radio troops for setting up radio stations renders this task far easier. In extremely hilly terrain, the helicopter is able to perform the duties of a relay station temporarily.

For the mission of ordnance troops, the helicopter finds still another field of employment. Reconnaissance from the air facilitates the rapid location of suitable dump and storage sites with the necessary approach and departure routes. In major combat action it can be used for the control of arriving and departing traffic in order to avoid traffic jams and blocking.

Maintenance of communications with the fighting forces and the supply columns from the depots and railway and naval unloading points is important. It will be especially important to get critical supply items such as special ammunition, special equipment, and replacement parts where they are needed without delay. At the same time repair troops also may be transported directly to vehicles in need of repair.

Mountain Warfare

It was in the domain of the missions of mountain troops that the first clear recognition of the military value of the helicopter was shown. They show, particularly, that the replacement of pack animal columns by the helicopter was possible to a large degree and that by this means a considerable number of men and animals were saved for other purposes. One especial advantage in this connection is that a larger individual load—such as a mountain gun or some piece of engineer equipment—can be carried at one time. In conducting mountain warfare, the matter of

transportation and supply plays a much more decisive role than in combat in level terrain, since it often presents almost insurmountable obstacles.

In the movement of special details in high mountains, whether it be for the fulfillment of tactical missions or the performance of heavy labor missions such as the construction of cableways or gun emplacements, the transportation of the crews by helicopter to the places of their activity not only has the advantage of greater rapidity but the forces reach the place of their activity in a fresh physical condition instead of exhausted by their long journey in the mountainous terrain. The transportation of warm food to the crews, made possible by the use of the helicopter, is of great importance to forces that cannot prepare their own food.

It is characteristic of mountain warfare that the mobility of the forces is limited. Heavy weapons when once emplaced cannot be moved without the loss of a great deal of time. Since the helicopter overcomes this difficulty quickly, it gives an unusual freedom of action to the conduct of operations in mountains. Therefore, it is able to intervene with strong forces at the time and place needed. In this, the helicopter is a unique and extremely important means of action.

Reconnaissance for the construction of field positions, ferries, bridge sites, and barriers and obstacles can be done more easily and rapidly from the air than from the ground.

Special Missions

Watch of the river above a bridge for mines and floating tree trunks as well as the regulation of traffic at the crossing points can be more efficiently done from the air. Also, reconnaissance for routes for field railway tracks and the construction of roads and pipelines can be accomplished better from a helicopter.

An especially valuable and important field of activity for the helicopter is of-

fered by ice jams and floating ice. The most effective way for determining the magnitude and reach of ice jams and floating ice is from a helicopter. And certainly the helicopter greatly aids the placing of demolition charges and the effecting of demolitions.

The ensuring of a water and electrical supply for the troops, staffs, shops, depots, and hospitals can be achieved much more readily when specialists are brought as rapidly as possible to the central plants or distributing installations. Demolitions that have been carried out, especially in the distribution systems, can be discovered and eliminated more quickly. In the case of attacks on posts, railway installations, important bridges, and tunnels, especially when atomic weapons have been employed, it will hardly be possible to get to them over the ground to determine the damage done and initiate vitally needed repair activities. From the helicopter, however, a clear picture of the situation cannot only be immediately obtained, but individual points of an important nature can be noted immediately and steps undertaken against secondary dangers where necessary.

For the medical service there exists, in addition to transportation of wounded, another equally comprehensive and important domain of activity. Employment of atomic weapons imposes requirements for greater mobility and dispersion on the medical service. Such great losses can occur at focal points by the use of atomic weapons that an immediate assembly and engagement of all available medical forces and units will be required. The areas for the assembly of the wounded and for field hospitals must be reconnoitered. In the meantime, doctors and other medical personnel must be transported to these casualty assembly areas. There will be medications, instruments, and dressing materials to be brought up from the rear. All these are tasks for whose simple and

rapid accomplishment the helicopter is best suited.

Assault Operations

Apparently there was scarcely any movement of units by helicopters in Korea, or at most, only to a small extent. In war games, however, tests are reported to have been made in which the helicopters were given the name of "sky cavalry." By use of night flights, positions back of the enemy's front were occupied and, at dawn, again evacuated.

Theoretically, situations are unquestionably conceivable in which the engagement of a helicopter unit for tactical assault operations could be of great or even decisive value. One is led to this view by the fact that modern combat no longer knows any continuous front and, therefore, leaves open space and freedom of movement on every side. Also, a numerically small but modern unit with select personnel and high-efficiency weapons is able to develop surprising firepower. Both of these developments favor the employment of the helicopter by units.

It is, therefore, entirely possible to conceive a helicopter squadron consisting of 20 to 30 helicopters with a three-man crew each in addition to the pilot, in which each man is a select individual fighter and equipped with a weapon of high firepower. The unit will be engaged against an enemy sector which, due to terrain obstacles, is weakly occupied, but important in the development of the combat operations. By taking advantage of weather conditions, camouflage, and cover, this type of unit could have a major effect on combat operations.

Another use might be in a situation where a bridgehead that has been occupied by an advanced enemy detachment is attacked by a helicopter squadron. Also, a bridge might be defended to the last minute by a helicopter squadron in order to give the main body of forces maximum time to establish a defensive position.

Such a unit would be able to lay down quickly a smokescreen over a terrain area to conceal it from enemy observation. Opinions also have been expressed to the effect that such a unit would be able to create broad passages through minefields by the dropping of explosives, but this would hardly be practicable except in the case of areas no longer dominated by enemy fire.

Only the most maneuverable of the small helicopters which are easily concealed could be used for the unit activities described above. A mission for medium or large helicopters in unit operations would be the transportation of a major troop unit to another location for regular combat engagement. Here, of course, we are less concerned with a *coup de main* operation than with a new type transport problem. This operation would, of course, have to be conducted under convoy protection since these heavy machines cannot be brought up secretly, as can the light ones.

That the United States intends to exploit these possibilities is shown by the successful experiments with the helicopter assault carrier, *Thetis Bay*, a remodeled aircraft carrier capable of carrying 20 large helicopters with 1,000 assault troops.

Conclusions

This theoretical study has shown some of the manifold possibilities of the employment of the helicopter in the army. It has demonstrated that three major classes of these aircraft, established on the basis of their missions, are justified.

It should be clear that the helicopter does not belong in the framework of the tactical air force, but represents an auxiliary means to be allotted to all three elements of the armed forces. The center of gravity should be on the land—with the army. Since it is to be expected that helicopters will be assigned to all three branches of the armed forces, the central army organization must maintain the closest connection with other portions of

the armed forces, and in its organization and further development of aviation, seek constant counsel from the air arm.

In equipping the army units with helicopters, the necessity for their use by the higher staffs must be remembered. In all higher staffs down to the combat team, a flight of at least three helicopters should be provided.

To what degree independent helicopter units should be constituted for tactical assault operations or major transportation tasks, and to which tactical units they should be assigned either permanently or temporarily, is a question which cannot be answered today. The results of experiments with respect to these matters would have to be known first.

In ordinary march movements the small helicopter can be taken along—loaded on a truck or a two-wheel trailer—and can be made ready for flight in a very short time. A shop truck with several mechanics is required for each flight of helicopters because they need constant and careful servicing to assure safe operations. In addition to care and servicing by specially trained mechanics, a regular overhauling platoon must be provided for constant checking and necessary overhaul. Equally important is the organization of a rapid and frictionless parts replacement system, since many of the parts of a helicopter, after a certain number of hours of use, cannot be repaired and must be replaced.

For the missions mentioned in connection with the various types of forces, the necessary number could be about as follows:

Type of Units	Helicopters
Atomic, biological, and chemical warfare	Staff ----- 2 per company ----- 1
Artillery	Staff ----- 1 per battery ----- 1
Signal	Staff ----- 1 per company ----- 1
Ordnance	Staff ----- 3
Mountain	Staff ----- 2 per company ----- 1 per platoon ----- 4
Engineers	Staff ----- 2 per company ----- 1 per platoon ----- 2
Technical	Staff ----- 2 per company ----- 1 per platoon ----- 2
Medical	Staff ----- 2 per company ----- 1 per platoon ----- 6

If possible, pilots for the helicopters of the various types of forces should come from the category of forces with which they are engaged. They must possess the technical knowledge and skill of this arm and the tactical knowledge necessary, since under these conditions they will be best able to fulfill their missions.

The Evolution of Methods of Warfare

Translated and digested by the MILITARY REVIEW from an article by General J. Revol in "Revue Militaire Suisse" (Switzerland) March 1957.

WAR is the continuation of a diplomacy that is unable to gain its desired results by other methods. It is one of the strongest manifestations of human activity, and applies principles which are recognized universally although limited in number and uncertain as to definition.

Imaginative and constructive ideas, superiority of material and means applied at the time and place most suitable to the attainment of an objective, dogged perseverance, and an aggressive mind are useful in every type of peaceful activity. Transformed to the military domain, these

become surprise, maneuver, superiority of weapons and material, economy of strength, the offensive, and character and decision in leadership. The same principles seem to lead to success in peace and victory in war. But the application of these principles and their exact definition in terms of methods is quite different.

Napoleon defined this when he said: "The art is quite simple, everything depends on how it is accomplished." There are as many methods for the conduct of a war as there are actual problems to solve, and each depends upon the means available to the hostile nations. These war potentials undergo a constant change. They depend upon the structure of the states, their political and social organization, the spirit of the population, and the military worth of the army. Particularly in case of the latter, the force of public opinion, weapons, and quality of leadership are important.

A certain uniformity may be observed if the war has been going on for some time. The result is a characteristic evolution of the methods of warfare employed.

The purpose of the following is to arrive at a definition of the probable methods of warfare of the future by briefly examining previously used methods.

Von der Goltz wrote:

Modern wars have become a concern of nations. Nations, like individuals, have come to have certain interests. National egoism is inseparable from national grandeur.

And Moltke added:

The stock exchange is so influential that it may use armies in defense of its interests.

This reminds us, strangely enough, of accusations by leftist parties against the "gun barons." Another example was the conquest of the *Lebensraum* pursued by Hitler.

For this reason all intellectual, eco-

nomic, and material resources have been used in order to ensure victory. What may be called the warfare of the 19th and the first half of the 20th century is characterized by lightning campaigns, by a desire for immediate decision of the battleground, and by complete annihilation of the hostile army and the center of power of the opponent. Only operations and tactics that led quickly and directly to these objectives were chosen. Concentration of troops as close as possible to the border, and attack in irresistible shock waves against the enemy were the resulting policy. This policy is contemplated even when a nation is involved in a political defensive. Movement became the supreme law of strategy.

The aggressor enlarges the battle maneuver of the 19th century to the battle operations of 1914 to 1940. Here, strategy and tactics tend to be one. Immediate decision is sought and will certainly assure victory for the aggressor.

The method introduced by Napoleon is completely different from preceding methods of warfare. The Marshal of Saxony said in his *Réveries*:

I try to avoid battles especially at the beginning of a war. I even think that an experienced general might thus go through all his life without being forced into a battle once.

And Berwick was called the "Immortal" for his ability to win a war without battles.

It is easy to jeer at the type of wars they fought in those times. They were dynastic or cabinet wars, limited in objective and material. They were considered by Clausewitz as a "diminutive form." He said:

Only the governments were interested in the war. The people were not interested in the political reasons that brought them about. Forced into the war they were only the blindfolded actors. The generals, themselves completely dependent upon their governments, acted hesitatingly in fear

of disobeying instructions. Their moves were careful and slow.

Foch described the method as follows:

The ancient methods of warfare tried to keep armies together and unharmed as much as possible. In order to win, the ancients employed tricks, menacing, negotiations, maneuvers, battles, occupation of territories, and seige as well as destroying and taking positions of the enemy.

The Difference

If we take a closer look and consider the means at the disposition of the generals in both epochs, the difference between a war of countries and a war of dynasties soon becomes apparent. Louis XIV, William of Orange, and Frederick II did not favor a slow and harmless war. They would not have hesitated to use any method, had they known it, that would finish their adversaries with less effort in less time.

If the progress of war was slow, if one went only hesitatingly into battles, if the offensive spirit was kept constantly under control, we have to blame the military machine that demanded a slow pace. The decision was avoided because of inefficient weapons. Their development and organic evolution changed the methods of warfare more than anything else. Faster and more powerful weapons make it possible today to attain the objective of any war much more quickly, whether it is caused by political, monarchical, or national interests. A closer look might explain this even better.

The battles of Turenne and Condé actually were word fights. The influence of the musket still was negligible. Each army had about a dozen pieces of artillery that were difficult to manage. Only seldom was artillery used in preparation for an attack.

The formation of the army on the move or in battle consisted of a single body, holding the troops close together. The

front was always closed. The enemy had to be kept from breaking through the center of a frontline during the encounter for fear he might "roll up" the separated parts. Both armies faced each other in about equally strong fronts, man against man, and either army could always retreat in any chosen direction during the battle. Thus the battle was based upon mutual agreement.

In order to be able to force a battle upon the opponent, the range and effectiveness of artillery had to be improved. A quick and decisive war could be fought only when the artillery broke down obstacles and the structure of armies permitted independent action of detached units. Additionally, firepower and maneuver were required to limit the area of operations and prevent the retreat of the enemy.

This, however, did not occur until the end of the Seven Years' War. The rifle constantly was improved and finally replaced the musket. In 1720 it was possible for a soldier to shoot several times within a minute. Guns of small caliber had been employed by the Swedes and Russians for some time. In 1740 they appeared in the west and built a deadly zone around the infantry. From that time on it became useless to protect towns with fortifications made of wood or stone. The war was fought by an aggressor and a defender. If the former wanted to employ an enveloping operation, he had to execute great troop movements and the empty area between wing and battle corps had to be filled with fresh troops. This was the general battle order employed by Frederick II.

But we had to wait for the following generation before the troops learned to change quickly from marching columns to fighting lines and vice versa. This way it became possible to abolish the slow and lengthy methodological engagement. The retreating enemy was attacked immediately with everything at the victor's disposal.

At the same time, the principle of the division—that is, of large units comprising all arms—was adopted. This made it possible to encircle a wide enemy front, to attack him from a distance, and to channel his movement into a planned obstacle. This was the end of the battle of mutual consent and the war of positions. From here on the offensive and the mobile warfare began their considerable progress.

Other details also made their contribution: good maps, reliable material for the construction of bridges, improvement of roads, industrial development, increasing wealth of the people, and, above all, progress in the development of artillery. In 1765 the system of Gribeauval introduced a lighter artillery with increased efficacy. He made the field artillery a weapon powerful enough to compete with the other arms on the battlefield. But the coming of Napoleon was necessary to combine the actual possibilities of the preparation of war of his predecessors into a harmonious and living complex.

In the study of military history it is easy to see that the methods of warfare were not so different in the wars which followed Napoleon. They were merely the results of a continued and definite progress. They were less a multitude of methods than just one method in many apparent manifestations. Actually, it has always been the same method of war with the same objective—to destroy by employment of force the forces of the enemy and to compel the defeated enemy to surrender. The importance of the military leader for such a decisive work of destruction is apparent.

At the end of the 17th century all elements providing the definition of the method of warfare were in existence. The system of a cordon, found completely obsolete, had been abolished and replaced as Napoleon's brilliant victories show. Not very long ago a continued front, closely resembling the cordon front, still was de-

sired by mediocre military leaders. But tanks and planes had opened new horizons for others with the expectations of even greater achievements. Without doubt these still will bear considerable importance in future conflicts.

War seems to become more and more just another field of science with a number of scholars trying to master it. For those who are specially gifted it remains an art—the finest of all arts.

Geopolitical Factors

The influence of the political, social, and economic institutions of warring states is strong. Their size and geostrategical positions are of importance as well as their unilateral or coalition structure. It is quite true that the intensity and speed with which the means of war are put into action depends very much upon the structure of the government. A dictatorial power will act with more secrecy and will need less time for an important decision. It will enter into the war with more savage energy and power than a government exposed to the critique of a free press and dependent upon public decisions of parliamentary assemblies.

A single state in war will be less influenced by additional or foreign obligations than a coalition of states. Feuquières once declared that it is better to dispose of one's allies in order to wage a better war. Guibert wrote that a well-secured and really strong state will by its very nature despise allies. He continues to say that a clear distinction has to be made between true power dependent upon the right proportion and constitution of a government and an appearance of power suggested by too extensive possessions and temporary triumphs.

Geostrategical questions and imperatives are decisive today but not quite clear. All our interest concentrates on the eventual outbreak of war between the USSR and the United States. What will become of the leitmotiv of the Napoleonic method

—the conquest of the capital? How would the essentially continental Russian Army ever reach Washington except by air raids or intercontinental ballistic missiles?

The occupation of Moscow by Americans, on the other hand, would not decide the war. Napoleon was the first to find this out and Hitler could not reach it. The Americans would be able to occupy it. The Russians could always retreat and rely upon the vast resources offered by Siberia and their Asian allies. There they would adopt a method of theoretical indefinite resistance on the battlefield. In short, neither of the two adversaries would be strong enough to win the war solely by the power of his weapons.

Neither the American nor the Russian Armies, no matter how great the offensive potential offered by modern industry and science might be, could survive an engagement that would drain their strength because of the great spaces both nations have at their disposal today. The Napoleonic method was invented for and applicable only to European nations of a certain size. It failed against the Russia of Alexander and will be no more successful against it in world war III.

Technical progress has an important influence upon military operations. Up to now the initial battle was of extreme importance to the outcome of the war. It brought almost all the armed forces of both adversaries into play. The troops employed the same armaments from the beginning to the very end of the campaign. It was possible to foresee from the outcome of this first battle that the loser would either be finished or seriously handicapped in his future operations in the later course of war.

Today's Problems

It is quite different today. The range of weapons is such that they can reach every part of the opponent's territory. The depth of the battlefield has increased from several feet, where man fought against man,

to several miles at the end of the last century, and from now on will be practically unlimited. There is no longer any distinction between front and rear areas, between armed areas and the inner part of the country. Nothing can be completely protected against projectiles and missiles, or against paratroopers and other aerial attacks. At the same time, research in laboratories goes on for new machines, and the production of material continues. The armies of all countries will need more and more of these products in order to be able to meet the demands of warfare.

The quantity and quality of military power of a nation now is spread out all over the country instead of in concentrations near the borders. It is impossible to shake and destroy the resistance of the population with one blow. There will, of course, still be battles taking place near the border. One cannot just open the door to the occupation troops of the opponent. But these battles will not have the decisive character they had in the past. After a battle of the border is won today, not much has been gained. The enemy territory remains unconquered. If lost, the encounter will move slowly toward the interior of the country, the force of resistance equaling the initial effort of attack as closely as possible.

Nowadays it is fashionable to advocate guerrilla war. The guerrilla war in Spain against Napoleon was successful. His battle forces were out of place there because of lack of occupation troops. Only modern military service could have provided them. This type warfare, however, remains a barbaric and primitive form of war. Most probably it would be inefficient in civilized countries like those on both sides of the Rhine.

Another solution would be the creation of a national defense such as the one that Gambetta brought into being in 1870 after the French Imperial Army broke down. It is a fact that they prolonged hostilities

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for several months. In reality they were without power, not so much because of inefficient leadership when they wanted to relieve besieged Paris, but because they were a dangerously weak and improvised force.

The Solution

The only effective solution seems to be foresight and an organization prepared for the territorial defense of a country that is surrounded by battlefields instead of borders. The country itself must become a huge camp with active and passive sectors, with mobile counteroffensive troops and a centralized logistical system. Deep shelters, dumps, and factories producing war materials must be built. Both withdrawal zones for the civilian population and peacetime armies organized of elements similar to the actual battle forces will be necessary. As soon as mobilization is declared, these units will join the forces as reserves. They will not be equivalent to the National Guard of yesterday.

A country having atom or thermonuclear bombs is powerful enough to prohibit war to other countries that do not have these weapons. The same phenomenon that marked the introduction of artillery occurs again. Because a king was the only one rich enough to manufacture cannons, he finally found himself in a position to suppress the private wars that he had tried in vain to prohibit by royal command.

There is a danger, however, that the purposeful dispersal of the means of combat renders the quick annihilation of the enemy's war potential impossible. This could easily lead to an indefinite war similar to those of the distant past. Clausewitz foresaw this type warfare when he wrote: "Only by political division is it actually possible to govern great states." In his case he contemplated only France. What would he have thought about our present-day giant nations?

Moral forces are another factor, and

are seldom mentioned in maneuvers and war games. Their importance and existence, however, is admitted by both sides. They are expected to neutralize each other but actually that never seems to happen. There will always come a time of imbalance.

Summary

Before Napoleon it was impossible to force the enemy into a battle if he did not desire the encounter. The only possible action was to invade a province near the border, to maneuver and take positions of the enemy, and to plunder part of the population without being able to bother the rest of the population of the country seriously. Peace negotiations were long and drawn out. Often a peace treaty was just a rough and ready compromise arising more out of the carelessness of leaders than from exhaustion of their material reserves.

Under Napoleon and thereafter a war was conducted with maximum intensity. Destruction of the army of the opponent in an initial general battle, occupation of the capital of his country, abolishment of government, and dictation of peace terms favorable to the winner was the pattern.

It seems that in the near future it will be impossible to destroy a hostile combat potential quickly and effectively solely by the Napoleonic method. One will have to make a powerful attack with all possible means against the war potential of the enemy. Occupation of the largest possible part of enemy territory will be desirable. Unceasing aggressive operations will follow until, weakened by military as well as by political force, the enemy whose country has been invaded is willing to accept the dictated peace terms.

One has to agree that this method will be the result of two precedents. It leaves the unforeseen part to the technical skill and character of the statesman, while military leaders assume command over the operations.

Atomic Weapons and Swiss Artillery

Translated and digested by the MILITARY REVIEW from a copyrighted article by Colonel L. Sallenbach in "Allgemeine Schweizerische Militär Zeitschrift" (Switzerland) March 1957.

THERE are many views on the effect of atomic weapons on artillery. Some, for example, consider that fire concentrations will be impossible, while others vehemently deny this contention. This article discusses these differences of opinion and attempts to determine the effect of tactical atomic weapons on the organization, matériel, and employment of Swiss artillery.

As some maintain, it may be that the introduction of the tactical atomic weapon is only another step in the development of increasing power of combat means. Even so, it is certainly a step of far-reaching effect, and the artillery, along with other combat arms, is confronted with a resultant drastically modified concept of military operations.

For Switzerland, there exists a choice of which of the two accepted forms of defense to favor—static or mobile. However, we must be ready to employ either type as circumstances require. Accordingly, the artillery has to be prepared for both.

The Static Defense

A defense front was formerly two to four miles deep. Today, it is six to nine miles deep. An enemy artillery preparation previously extended to a depth of about three miles. With the employment of tactical atomic weapons, it may be to a depth of nine or 10 miles. The artillery, in a static defense, was close behind the combat front in a zone of relative safety, and from there it was possible to cover the entire defense front. Direct as well as general artillery support was ensured by this favorable location. In the future it will be necessary to echelon the guns according to the depth of the defense front. With the same number of guns a smaller local density of fire will result. Because of the great depth of future artillery prep-

aration and the great local effect of atomic shells, the artillery will suffer heavier losses. For these two reasons, a considerable weakening of our firepower is to be expected.

The direct artillery support by single batteries also will depend upon the size of the target. As there will be no relatively safe zones within range of enemy guns, direct support will be most effective and reliable if the guns stay near the infantry. Some of the artillery will go into positions as far advanced as possible—within two to three miles of the front. These weapons must be able to turn 360 degrees in order to be able to fight on all sides.

Artillery is the fastest available element to be used against concentrations of tanks and infantry. With this fire the command will be able to deal powerful blows. Guns of neighboring positions and from the reserve will need to replace the fire of units destroyed by atomic action. A high degree of mobility for these weapons is necessary and the greater the range of the artillery the better it will be able to perform these tasks.

The Mobile Defense

The reserve units are displaced widely in a mobile defense. The moving nature of the engagement will make frequent displacements necessary. The artillery must not only be able to follow mobile units but must be ready also for immediate action if necessary.

The direct artillery support in a moving battle will be normal, but as many guns as possible are to be held for general support. Depending on circumstances, it may be possible to engage these weapons from a rear area position before intensive infantry contact takes place. Guns with a great range facilitate such arrangements.

Atomic gunfire support is not likely in a moving battle since the displacement of this kind of artillery takes time. The conventional artillery of the enemy also has to be brought up to the front before it can go into action. This should present Swiss forces with at least a temporal superiority.

Mobility with regard to transport, and a quick transition from movement to position and action are, therefore, necessary in a mobile defense if it wants to meet the demands of modern warfare. A wide dispersal of positions will be necessary for this kind of defense and probably will come up as a natural result. The artillery will fight under more favorable conditions than in a stable defense front.

Artillery Fire

The principle of using minimum guns and ammunition for a task still is valid. As has been mentioned, it will be possible to fulfill the direct support tasks frequently with only a battery or battalion of artillery. With observation and good communications no problem should arise in the future.

It is important to know whether it will be possible to fire general support concentrations under the conditions of mobile warfare. I believe that it is possible. Our new maps permit fast and accurate designation of positions and targets. It will be possible for the static as well as the mobile defense to plot future targets in advance even under unfavorable weather conditions. The targets will be areas with natural or artificial obstacles where enemy units necessarily will concentrate. Assembly and observation areas can be recognized in advance.

Other armies, of course, will deal with those questions very carefully as they frequently have to fight in areas that are unknown to them. Unfavorable observation conditions do not favor exact target designation. A survey needs days to complete work necessary for effective artillery concentration.

This means that there will not be enough time in mobile warfare. Pictures taken by planes are useless if the recognized targets cannot be designated by coordinates; the recognition of an artillery target on a radar screen is as useless. For these reasons survey by adjustment of fire is important for foreign armies. But even with this method it should be difficult for a foreign army to concentrate the fire of battalions in distant positions. Swiss artillery has an advantage here that must be exploited.

The fire plan of corps and divisions is of increased importance. It must be possible for the divisions to provide artillery support for each other. Fire control elements within the regiment, as well as each division fire control center, must be able to direct fire not only in its own but also in neighboring sectors. Fire plans have to be prepared accordingly.

Automatic computers facilitate fast and exact work of the fire control centers. Some such machines are being given to the troops already, others are still in development.

Artillery Positions

The introduction of atomic weapons will not influence the position of batteries and artillery regiments if the latter is to be kept as a fire unit. Positions have to be chosen to provide fire in all directions if possible. Batteries within range of conventional artillery of the enemy have to provide for alternate positions.

In the future, our guns will be within the combat area. More attention has to be paid, therefore, to a close-in defense against tanks and artillery. Whenever possible, positions should be chosen away from probable axes of penetrations. These battery positions, if coordinated with the infantry, will be strongholds of considerable strength.

Regiments have to be dispersed in order to avoid the loss of more than one to an atomic projectile. For a static defense,

the first artillery regiments will have a depth of two to three miles, then a second formation within four miles, and heavy regiments six to eight miles from the front. This ensures necessary dispersion and support of the whole front area at the same time. Dummy positions have to be used in order to distract enemy fire.

Observation

The tasks of sector commanders have increased considerably. Close defense against planes, tanks, and infantry must be organized and coordinated with the infantry and the antiaircraft defense corps. Preparations have to be made for changes of position. The commander has to be prepared for the unexpected withdrawal of a regiment that might be needed elsewhere. Organization of artillery close observation within a range of one to two miles is of increasing importance.

Ground observation is still the most important means of designating targets and directing fire. The observation has to be spread out evenly over the entire area and depth of the defense front. However, it is not possible to man all observation positions even if observation units would be increased considerably because of the great dimensions of the front. Observers in infantry areas will control all the fire of direct artillery support and shoot either upon request of the infantry or at the direction of a higher echelon. These observers will remain in close communication with the infantry and will not be withdrawn or exchanged even if another artillery unit replaces their own.

Fire of general support artillery demands, above all, exact timing. To assure its maximum effectiveness, the greatest possible number of observers must be kept in reserve. These observers have to be very mobile in order to be able to occupy the most favorable observation position quickly. They are equipped with cross-country maneuverable armored cars that will protect them against small-arms fire.

For a static defense they are sent out together with a reconnaissance detachment after an atomic attack. The time program of the command loses most of its value if it cannot be executed under proper observation because of the great range of combat action. Even in the mobile defense independent artillery patrols will take position in prepared observation positions in order to go into combat early.

Ground observation has to be complemented and supported with all possible technical help in order to be able to increase the effectiveness of the artillery. Observation by planes of all kinds might still remain important under favorable conditions. Sound-ranging devices, radar, and even television should be tested for eventual employment by artillery observation.

Communications

Modern warfare demands better communication services. Wireless communication has become most important because of the decentralization of weapons and observation, and communication with observation posts will be conducted mainly by radio.

In the French artillery regiments fire control within the division is done by wireless communication with very simple sets. The Swiss artillery has new radio sets with many frequencies that may be used for several purposes, and should ensure optimum fire control of our artillery. Although radio static often will interfere in mountain areas, fewer troops are employed and movements are slower. In the middle of Switzerland where mass employment of the artillery is possible, radio communication will be important.

Reorganization of Command

Before and during World War II, the Swiss artillery was employed by batteries or regiments and placed directly under the command of battalions or regiments of the infantry. Because of short ranges, insufficient means of communication, and

lack of exact firing information, this was the best method of control initially. Later the introduction of modern guns with a greater range, the improvement of communication, and the continuing development of artillery methods permitted the concentration of artillery under one command to achieve a maximum of efficacy. The positions were mostly out of the combat range of the enemy and the fire of the artillery could be adapted according to the tactical situation.

Today, the circumstances have changed again. The artillery is once more within the combat area. The regiments are decentralized considerably, and sometimes the forward echelon is far advanced. Decision is sought in movement. Direct placement of regiments under infantry regiments will be advisable, therefore, in many cases including the static defense. Even if such a division of artillery takes place, the central fire control of units still is required if full effectiveness of the artillery is to be maintained. A quick change of command must be possible. Concentration into groups has to be provided for in case of loss of a fire control central. Communication training is most vital in this respect.

Some of the artillery, particularly of the army corps artillery, are to be held in reserve. Employment will be prepared by survey and reconnaissance of positions, by construction of ammunition dumps, and other necessary preparations. Communications will be prepared and operative.

Increase of Firepower

At the present time an increase in the amount of artillery would be the best way to increase our firepower. The Swiss Army needs 15-cm guns on self-propelled mounts with a range of up to 14 miles. Their greater range would reduce losses due to enemy atomic fire, and their fire could cover great areas from the same position. This is important to quick and positive support of infantry operations.

Future procuring or even fabrication of

atomic shells for this 15-cm gun would be necessary. There are already reports on cheaper atomic shells and it is possible that the Swiss artillery will have this weapon in the future. But until then the following stopgap measures are necessary:

A considerable increase in number of our observation and liaison detachments will ensure full employment of our guns.

New shell designs and better powder could increase the range of our present weapons, and facilitate fire support in neighboring sectors.

A number of mortars with a range up to three miles, placed at the disposition of the infantry, would relieve the artillery from many tasks of close support. The artillery could then concentrate on general support.

Heavy anti-air defense guns and tanks would increase the firepower of the infantry. Officers commanding these weapons do not need special training. It would be sufficient for them to know the work of a fire control station and the necessary survey tasks.

It is necessary to follow closely the development of all weapons like guided missiles, for example, that could increase the firepower of our artillery.

Final Notes

How far and fast the Swiss artillery adapts to atomic warfare depends upon the stage of development at the time. In order to break up a front of 120 miles, 100 atomic shells are needed. American atomic guns fire at a rate of six shots per gun per hour. Therefore, 10 guns would have to shoot for about 90 minutes in order to fulfill the task. Simultaneous employment of planes with atom bombs would not save much time, as a time-consuming coordination of both weapons would be necessary.

I do not know how far the necessary dispersion of this weapon will affect its employment, but it is clear that hours, rather than minutes, will be needed to

create significant gaps in enemy lines. This, of course, will change when the atomic shell becomes a mass product to be fired by 15-cm, and perhaps even by 10.5-cm, guns.

Today, we still have to expect attacks with traditional weapons, perhaps reinforced by atomic weapons. If we are prepared for atomic warfare, adaptation should not be too difficult.

Switzerland must have an army adapted to our country. We do not have an always overflowing human reserve like China or Russia. On the other hand, we have a large number of well-trained men. This enables us to make full use in the army of all technical advantages. Every soldier has to be a specialist with a heavy weapon of his own, a machinegun, a launcher, a tank, or an antiaircraft gun. In the de-

fense, the fire is important and we should not replace it by manpower.

Particularly, long-range weapons are part of the technical progress. Let us keep in mind that the artillery is just as important as tanks and aircraft.

Equipped with tanks and armor-piercing weapons, the Swiss armed forces will have the means to stand any challenge. But without artillery, the highest quality would be meaningless and shift the balance of power toward the enemy. The artillery of the adversary would attack with impunity. This would give the enemy a chance to assemble his troops and prepare for action at any moment that seems favorable in order to finish our infantry.

The stronger our artillery, the better the fighting conditions for our infantry, and the less the losses.

Following are the answers to the problems appearing in "Keep It Simple" on page 63.

Answers: *Problem 1.* Approximately 400 roentgens.
Approximately 100 roentgens.

Problem 2. Approximately $\frac{1}{2}$ megaton, or 500 kiloton.

Problem 3. Approximately one mile.
Approximately 0.7 mile.

Problem 4. Approximately 16 roentgens;
(six r from the first and 10 r from the second).

BOOKS OF INTEREST TO THE MILITARY READER

WATERLOO TO PETERLOO. By R. J. White. 292 Pages. The Macmillan Co., N. Y. \$3.75.

By MAJ RICHARD L. WEST, *CE*

England emerged from the victory over Napoleon at Waterloo as the dominant world power of the 19th century, but the aftermath of almost 22 years of war was an increased interest in internal social and economic affairs. The common man was becoming socially conscious, with an increased concern for his lot in life and an intense desire for self-improvement.

Mr. White covers only the brief period from 1815 to 1819. This was the beginning of a difficult and often painful adjustment to a new social order. The author discusses the radical movements of the period and the government's efforts at suppression. The era was marked by such incidents as the "March of the Blanketeers"; the abortive "Derbyshire Insurrection," after which Jeremiah Brandreth and two collaborators were executed for high treason; and the "Battle of Peterloo," in which a popular demonstration held at St. Peter's Fields in 1819 was ruthlessly broken up by armed intervention. Government countermeasures included the activities of Sidmouth and his detested spy system, the passing of the Gagging Acts, and the suspension of the Habeas Corpus Act.

England was in a state of flux. The old order was dead. The industrial revolution had taken hold and population was shifting toward industrial centers. England's social revolution was in motion.

GEOGRAPHY OF THE USSR. A Regional Survey. By Theodore Shabad. 584 Pages. Columbia University Press, New York. \$8.50.

By LT COL HOWARD L. FELCHLIN, *Inf*

Although published initially in 1951, this reprint edition still is one of the most authoritative and comprehensive sources of published information on the geography of the USSR. It is not a definitive treatment of the subject, as the political and economic aspects of current problems are particularly emphasized, but this does not detract from the over-all value. Although factual information on existing conditions in the Soviet Union is incomplete, the author has utilized a voluminous mass of selected source materials, especially Soviet geographical literature, books, and current periodicals.

The book is divided into two distinct parts. The first is devoted to a general survey in which are discussed some of the basic aspects of Soviet geography. In the second part the regional approach was utilized, and is divided into subsections according to the 16 constituent union republics of the Soviet Union. A number of excellent maps, statistical tables, and a selected bibliography also are included.

In reading this book and studying the factual data, one must keep in mind the ever-changing nature of conditions in the Soviet Union. Scholars and soldiers alike will find Dr. Shabad's book to be a welcome reference work.

AN ATLAS OF WORLD AFFAIRS. By Andrew Boyd. 159 Pages. Frederick A. Praeger, Inc., New York. \$3.00.

By LT COL GEORGE B. MACAULAY, *Army*

Here, for the first time assembled into a single volume, is basic information on virtually every aspect of contemporary world happenings. It contains more than 70 maps which focus on important territorial disputes, alliances, political trends, and economic factors in today's world, with a brief summary accompanying each map explaining the background and summarizing the situation. In a book of this small size there are, of course, many details left out, but Mr. Boyd has demonstrated himself to be a master of selective omission.

To the reader who wants a quick reference to the phrases and names that occur almost daily in the news media, this volume will prove invaluable.

CHURCHILL-ROOSEVELT-STALIN. The War They Waged and the Peace They Sought. By Herbert Feis. 692 Pages. Princeton University Press, Princeton, N. J. \$6.95.

By LT COL JAMES R. FRANCIS, *MSC*

This work is appropriately further subtitled as a diplomatic history of World War II. The author weaves the story of the three named heads of state, their hopes, desires, fears, and aims. A difficult subject area is covered, and the author makes the most of briefing techniques to keep a sequence or event in context or in step with the particular period discussed. His reference material appears authoritative, including wide reference to the various Churchill epics on the period.

The book is a fascinating examination of the many sides to the art of diplomacy and the personal influence that the three named had in resolving or failing to resolve the problems of the day. The tragedies as they happened are there for close

examination and the author inserts little bias or prejudice to becloud the issue. The foundations of the split between East and West are displayed unemotionally and factually. The cases of the "Little Allies" are intertwined with the big picture to place them in perspective.

The book is well-indexed and divided into 14 periods for easier reference. It is strongly recommended for any serious student of the period and for background material for anyone seeking causative strategy or agreement behind the curtain of military operations.

NORTHWEST AFRICA: SEIZING THE INITIATIVE IN THE WEST. U. S. Army in World War II. By George F. Howe. 748 Pages. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. \$7.75.

By LT COL ROBERT M. WALKER, *Army*

This volume is the first in a series of five which will comprise the official history of the Mediterranean Theater of Operations in World War II. Varying somewhat from the previous volumes in the monumental series, the U. S. Army in World War II, it covers both the Allied and the Axis coalitions by tracing the parallel strategic and tactical decisions from the heads of governments along the chains of command to execution in combat zones.

It explains the reason for the extension of the battlelines across the Sahara and the loss of the race for control of Tunisia, and covers in meticulous detail the final concentric thrust of US, English, and French forces against the two German and Italian armies massed in the Bizerte-Tunis area.

Dr. Howe has accomplished the task of sifting the great mass of data and records available from myriad sources. The result is a readable and detailed volume that is a valuable addition to an invaluable reference series of which it is a part.

COMMUNIST CHINA TODAY. Domestic and Foreign Policies. By Peter S. H. Tang. 536 Pages. Frederick A. Praeger, Inc., New York. \$10.00.

By MAJ ROY W. FARLEY, *Armor*

Another in a series of publications on Russian history and world communism, *Communist China Today* is an impressive gathering of facts and figures together with an analysis of the past, present, and future of Red China.

The book is comprehensive in its treatment and brings to light much that has been obscure in the bewildering growth of communism in China. Opening with a short text on international communism, Mr. Tang, formerly a member of the Chungking Ministry of Foreign Affairs and an attaché in Moscow, presents a picture of the history of the Chinese Communist movement and its ideological background. Chapters cover the character of Party leadership, the Party structure and its relationship to the state machine, as well as a more limited treatment of the economic, social, military, and propaganda structure.

The author's conclusion that Communist control in Red China today is absolute is no startling revelation to those who have been following the Chinese Communist movement.

Communist China and the Soviet Union are certain to remain firmly allied as the directing core of strength in the Communist world . . . and the continued skillful manipulation of the would-be neutral nations in a sort of international united front will offer a standing challenge to the free world.

The book should have great reference value and contains an exhaustive bibliography. It is unfortunate for the military reader that Tang's treatment of the military is somewhat superficial in comparison with his exhaustive analysis of politics and Communist ideology.

SOLDIERS OF THE STATES. The Role of the National Guard in American Democracy. By William H. Riker. 125 Pages. Public Affairs Press, Washington, D. C. \$3.25.

By LT COL IRVING HEYMONT, *Inf*

The intervention with Federal troops at Little Rock focused attention on an old problem—the role of the National Guard. This problem is unique in the United States. No other nation in the world maintains two military forces with different peacetime command loyalties. The National Guard has been the subject of much heated discussion but of little cold study of the facts and history.

Professor Riker's book helps fill the existing void in the facts and history of the National Guard as an institution. He deals discerningly with the origin and development of the National Guard, its traditional responsibilities to the states and the National Government, and its present status in the national defense structure. The book also discusses federalism, State's rights, and the relations between the states and the Federal Government. The result is an interesting history and analysis of the military policy of the United States with a significant commentary on the Constitution.

Of particular interest to the military reader is the account of the growing Federal control of the National Guard to ensure adequate standards. The clear appraisal of the history of the political influence of the National Guard also is most interesting.

Too small to be a complete account of the National Guard, this book does help fill a considerable void in the literature about one of the major components of our Armed Forces.

THE NEGRO POTENTIAL. By Eli Ginzberg. 144 Pages. Columbia University Press, New York. \$3.00.

DRIVE. By Colonel Charles R. Codman, Aide-de-Camp to General George S. Patton, Jr. 335 Pages. Little, Brown & Co., Boston. \$5.00.

By MAJ L. GORDON HILL, JR., *Arty*

This book is a chronicle of letters which the author admits to be "simply an account describing such day-to-day personal experiences in wartime Africa and Europe as I felt might interest my wife." While most of Colonel Codman's letters may have been absorbingly interesting to his wife (they had traveled widely in Europe before the war), they hold considerably less interest for the military reader.

Between bumping into old European friends of 25 years' standing, thumping over miles of roads in the rear of Patton's jeep, and pumping the hands of the visiting great and near-great, the author apparently held up well under Patton's relentless pace. Considerable space is used in recounting such oft-told Patton incidents as the "don't worry about your flanks" and "run out of gas and walk" stories. However, for students of Patton, the book offers some fresh views which help picture the man. Codman once asked, "General, if someone had predicted that 26 years later you would be passing through this same spot on your way to the Rhine at the head of an army of 300,000, what would you have said?"

"I would have said, 'An intelligent and far-sighted prediction, because that is exactly what I mean to do.'"

As for handling Congressmen, the author records Patton's instructions for an impending influx of them as: "See that no drinks are served, and only the simplest food—just sandwiches, preferably stale ones. Otherwise, they are sure to go back and say we are living too well and wasting Government funds."

Probably the most significant contribution by this book is the author's detailed description of the German concentration

camps—Ohrdruf and Buchenwald. He relates that the gruesome sights caused even "Patton to become violently sick to his stomach."

Although the book may be good light reading to one familiar with the European theater, it leaves the reader with the thought that there is much of the Patton story that is untold here.

DER SEEKRIEG. The German Navy's Story, 1939-1945. By Vice Admiral Friedrich Ruge. Translated by Commander M. G. Saunders, Royal Navy. 440 Pages. United States Naval Institute, Annapolis, Md. \$5.00.

By LT COL ROBERT M. WALKER, *Arty*

This volume is the first authoritative account of the German Navy's activities during World War II. It covers in detail the tactics and strategy of the various campaigns, and gives an accurate picture of the part played by the submarines, the sea raiders, and the battle fleet of the Third Reich.

The final chapters of the book contain a remarkably clear-cut analysis of the weapons, strategy, and results obtained in the naval field by the German sea forces. It ends with a discussion of the postwar German Navy, what it is, and what it must be able to do.

The author not only participated in World War II as Chief of the Bureau of Ships in Berlin after distinguished service in naval forces in various areas of the conflict, but at present is *Inspekteur der Bundesmarine* of the Navy of the German Federal Republic, a position corresponding to that of Chief of Naval Operations of the US Navy. He has intimate knowledge of what happened, and also has the ability to narrate it clearly.

This book will be of extreme interest to all who appreciate the importance of sea-power in the past war and its potential in future conflict.

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